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GLOBAL DATA MONITORING REPORT

August 1999

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Berkshire
RG12 2SZ

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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background field). Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

Dr. B. Macpherson
Head of Observation Processing and Monitoring Section
Data Assimilation
Meteorological Office
London Road
Bracknell
Berkshire
United Kingdom
RG12 2SZ

2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1-2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. Only data from the main hours of 00 UTC, 06 UTC, 12UTC and 18 UTC are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At RSMC Bracknell, for synoptic stations at or below a height of 500 metres, reported mean sea-level pressure is used in the statistics. If this is unavailable the mean sea-level pressure is calculated from the reported station-level pressure and temperature.

For synoptic stations above 500 metres, the mean sea-level pressure is calculated from the reported station-level pressure and temperature, or, if these are not available the height of a standard pressure-level (e.g.: 850 hPa or 700 hPa). If neither of these are available, the reported mean sea-level pressure is used.

Some stations vary their reporting practice according to the observation hour (e.g.: some stations in the CIS report both mean sea-level and station-level pressure at 00 & 12 UTC, but only mean sea-level pressure at 06 & 18 UTC). For monitoring purposes, reported mean sea-level pressure is stored separately from that calculated from station-level pressure or height of a standard pressure-level. Only statistics for the preferred method (see above) are presented in this report, and so for certain high-level stations, such as those from the CIS, approximately half of the number of observations actually received will appear in the statistics.

Aircraft observations

TABLE 4 contains a list of statistics calculated from data received from all airline carriers.

Figure 3 shows 10 degree lat/long box average numbers of aircraft reports (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) received per day throughout the month at Bracknell and assimilated into model runs in the layer 70-500 hPa. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4-7 show wind statistics for AIREP/ASDAR (in AIREP/AMDAR code, including AIREPs, ACARs, AMDARs and ASDARs) in the layer 70-500 hPa. Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700

Figure	Parameter Plotted	Layer (hPa)
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics (**Geopotential Height and Windspeed at 100 and 500 hPa**) for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: August 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from UKMO global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 m s^{-1} (vector wind)

SELECTION CRITERIA :NOBS ≥ 20 , and one or more of the following:

1.|bias| ≥ 4 hPa (pressure),
≥ 5 m s^{-1} (wind speed),
≥ 30 degrees (direction).

2.SD ≥ 6 hPa (pressure),
≥ 80 degrees (direction).

3.PGE ≥ 25

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
ELTE6	ALL	P	SUR	80	0	0	1.1	-4.3	4.4
ELVI2	ALL	P	SUR	32	0	0	0.6	-5.6	5.6
ELVJ9	ALL	P	SUR	85	0	0	1.0	-4.1	4.2
OZLB	ALL	P	SUR	59	0	0	1.0	-4.6	4.7
PCCQ	ALL	P	SUR	85	0	0	1.0	-6.6	6.7
PCCW	ALL	P	SUR	46	0	0	3.2	-4.6	5.6
P3GF8	ALL	P	SUR	27	0	0	4.5	-4.1	6.1
P3YS5	ALL	P	SUR	98	0	0	1.3	4.6	4.7
UAIS	ALL	P	SUR	43	0	0	2.4	-6.4	6.8
UAJS	ALL	P	SUR	32	3	9	2.7	-4.7	5.5
UHLE	ALL	P	SUR	21	1	5	2.1	-7.3	7.6
VCRQ	ALL	P	SUR	23	23	100			
VRVW	ALL	P	SUR	78	0	0	1.0	5.1	5.2
VYNG	ALL	P	SUR	30	29	97	0.0	11.9	11.9
V2XM	ALL	P	SUR	31	0	0	0.8	-4.1	4.2
V2XO	ALL	P	SUR	36	0	0	1.8	-4.4	4.7
V7BB2	ALL	P	SUR	25	25	100			
WDZB	ALL	P	SUR	35	0	0	1.2	-5.2	5.4
WUW2120	ALL	P	SUR	30	12	40	3.7	-3.8	5.3
ZCAM9	ALL	P	SUR	66	8	12	1.8	11.9	12.0
ZCBF3	ALL	P	SUR	21	0	0	1.1	-4.4	4.5
3FFG7	ALL	P	SUR	29	0	0	1.5	-4.5	4.7
3FGN3	ALL	P	SUR	22	0	0	3.0	-6.8	7.4
48102	ALL	P	SUR	376	231	61	1.7	-0.6	1.8
48111	ALL	P	SUR	436	263	60	1.0	-0.2	1.0
62026	ALL	P	SUR	555	524	94	2.7	0.1	2.7
62142	ALL	P	SUR	632	0	0	0.9	4.4	4.5
9MCU4	ALL	P	SUR	20	0	0	2.8	6.1	6.7
WIND SPEED									
DDFT	ALL	SPEED	SUR	61	0	0	5.1	5.7	7.6
ELTZ2	ALL	SPEED	SUR	35	0	0	5.0	6.8	8.4
ELWC6	ALL	SPEED	SUR	31	0	0	6.0	12.1	13.5
FNRS	ALL	SPEED	SUR	30	0	0	4.4	8.0	9.1
MXHR6	ALL	SPEED	SUR	34	0	0	6.3	10.4	12.1
MXWJ5	ALL	SPEED	SUR	53	0	0	3.0	5.4	6.2
P3ZU3	ALL	SPEED	SUR	30	0	0	3.2	5.1	6.0
UCTP	ALL	SPEED	SUR	48	0	0	3.2	5.4	6.3
VRVD6	ALL	SPEED	SUR	31	0	0	6.6	7.5	10.0
V2PC4	ALL	SPEED	SUR	44	0	0	6.5	6.1	8.9
V2TE	ALL	SPEED	SUR	33	0	0	6.3	8.6	10.6
ZCBH6	ALL	SPEED	SUR	89	0	0	1.8	5.4	5.7
9VMY	ALL	SPEED	SUR	22	0	0	5.7	9.1	10.8
WIND DIRECTION									
ELSA4	ALL	DIRN.	SUR	22	0	0	46.7	43.1	63.5
3FSL4	ALL	DIRN.	SUR	39	0	0	59.7	-33.7	68.5
46061	ALL	DIRN.	SUR	401	0	0	26.8	-35.8	44.7
51311	ALL	DIRN.	SUR	68	0	0	10.7	-31.8	33.6

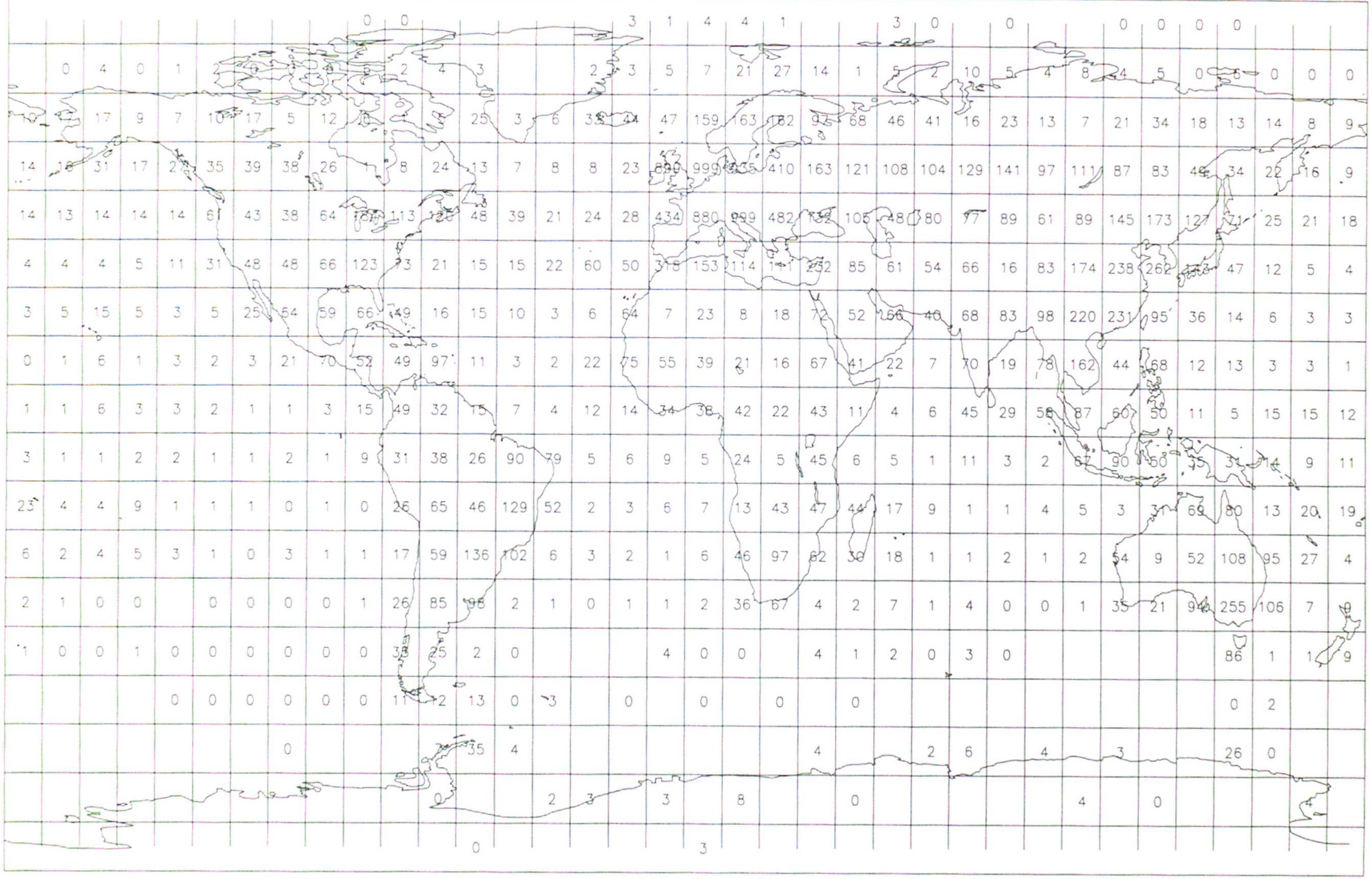
AVAILABILITY – SHIP/SYNOP – AUGUST 1999

FIGURE 1

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 21574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14 18 31 17 27 35 39 38 26 1 8 24 13 7 8 8 23 890 999 835 410 163 121 108 104 129 141 97 111 87 83 48 34 22 16 9
14 13 14 14 14 61 43 38 64 180 113 120 48 39 21 24 28 434 880 999 482 132 105 48 80 77 89 61 89 145 173 127 71 25 21 18
4 4 4 5 11 31 48 48 66 123 73 21 15 15 22 60 50 318 153 114 111 232 85 61 54 66 16 83 174 238 262 133 47 12 5 4
3 5 15 5 3 5 25 64 59 66 49 16 15 10 3 6 64 7 23 8 18 72 52 166 40 68 83 98 220 231 95 36 14 6 3 3
0 1 6 1 3 2 3 21 70 52 49 97 11 3 2 22 75 55 39 21 16 67 41 22 7 70 19 78 162 44 68 12 13 3 3 1
1 1 6 3 3 2 1 1 3 15 49 32 15 7 4 12 14 34 38 42 22 43 11 4 6 45 29 58 87 60 50 11 5 15 15 12
3 1 1 2 2 1 1 2 1 9 31 38 26 90 79 5 6 9 5 24 5 45 6 5 1 11 3 2 67 90 50 35 31 14 9 11
23 4 4 9 1 1 1 0 1 0 26 65 46 129 52 2 3 6 7 13 43 47 44 17 9 1 1 4 5 3 31 69 80 13 20 19
6 2 4 5 3 1 0 3 1 1 17 59 136 102 6 3 2 1 6 46 97 62 30 18 1 1 2 1 2 54 9 52 108 95 27 4
2 1 0 0 0 0 0 0 1 26 85 98 2 1 0 1 1 2 36 67 4 2 7 1 4 0 0 1 35 21 94 255 106 7 9
1 0 0 1 0 0 0 0 0 0 33 25 2 0 4 0 0 4 1 2 0 3 0 86 1 1 9
0 0 0 0 0 0 11 12 13 0 3 0 0 0 0 0 2
0 35 4 4 2 6 4 3 26 0
0 2 3 3 8 0 4 0 4
0 3

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: August 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for drifting buoys.
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Mean sea level pressure (hPa). :Wind speed (m s^{-1}). :Wind direction (degrees).
Parameters monitored	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the observation is veered to the background.**
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa :25 m s^{-1}	(pressure) (vector wind)

SELECTION CRITERIA :	NOBS	≥ 20 , and one or more of the following:	
	1.|bias|	≥ 4 hPa	(pressure),
		≥ 5 m s^{-1}	(wind speed),
		≥ 30 degrees	(direction).
	2.SD	≥ 6 hPa	(pressure),
		≥ 80 degrees	(direction).
	3.PGE	≥ 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
25536	83.7	137.2	ALL	P	SUR	234	6	3	2.2	4.4	4.9
31526	-38.3	-115.8	ALL	P	SUR	261	0	0	1.4	-5.7	5.8
33946	-47.3	-53.6	ALL	P	SUR	350	81	23	7.7	0.3	7.7
33948	-40.2	-17.7	ALL	P	SUR	176	89	51	5.5	-2.4	6.0
41655	15.1	-68.5	ALL	P	SUR	191	51	27	4.0	-6.8	7.9
44764	51.4	-0.7	ALL	P	SUR	177	1	1	2.5	-8.4	8.8
46925	25.6	-145.7	ALL	P	SUR	268	0	0	2.2	-5.0	5.5
54923	-27.4	-91.1	ALL	P	SUR	219	0	0	1.0	-4.1	4.2
WIND DIRECTION											
41638	25.0	-51.9	ALL	DIRN.	SUR	246	0	0	30.9	61.1	68.5
41641	14.9	-48.8	ALL	DIRN.	SUR	86	0	0	21.7	32.6	39.2
41651	25.6	-71.6	ALL	DIRN.	SUR	122	0	0	20.3	33.8	39.5
55587	-43.4	168.3	ALL	DIRN.	SUR	573	0	0	22.0	36.3	42.5

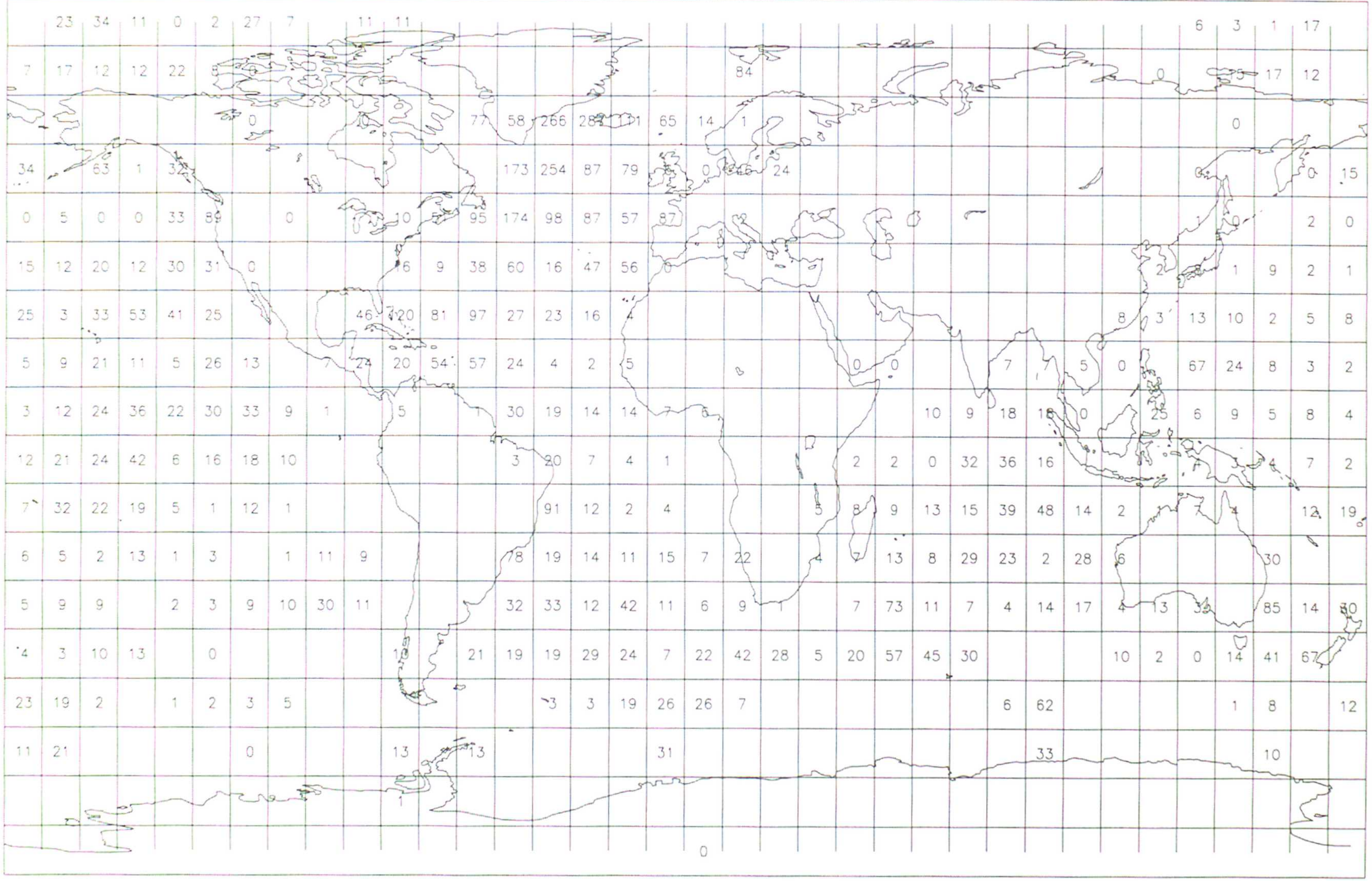
AVAILABILITY – DRIFTER – AUGUST 1999

MAIN HOURS ONLY

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 7141

FIGURE 2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7 17 12 12 22 84 0 15 17 12
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15 12 20 12 30 31 0 16 9 38 60 16 47 56 0 2 1 9 2 1
25 3 33 53 41 25 46 120 81 97 27 23 16 4 8 3 13 10 2 5 8
5 9 21 11 5 26 13 7 24 20 54 57 24 4 2 5 0 0 7 7 5 0 67 24 8 3 2
3 12 24 36 22 30 33 9 1 5 1 30 19 14 14 7 6 10 9 18 18 0 25 6 9 5 8 4
12 21 24 42 6 16 18 10 3 20 7 4 1 2 2 0 32 36 16 4 3 4 7 2
7 32 22 19 5 1 12 1 91 12 2 4 5 8 9 13 15 39 48 14 2 1 7 4 12 19
6 5 2 13 1 3 1 11 9 78 19 14 11 15 7 22 4 7 13 8 29 23 2 28 6 30
5 9 9 2 3 9 10 30 11 32 33 12 42 11 6 9 1 7 73 11 7 4 14 17 4 13 33 85 14 30
4 3 10 13 0 10 21 19 19 29 24 7 22 42 28 5 20 57 45 30 10 2 0 14 41 67
23 19 2 1 2 3 5 3 3 19 26 26 7 6 62 1 8 12
11 21 0 13 13 31 33 10
1
0

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: August 1999

Monitoring procedures		
Period		:One calendar month.
Data monitored		:Reports from each unique identifier for synops & autosynops.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Mean sea level pressure (hPa).
Parameters monitored	:HT(m)	:Station height (in metres) as given in WMO No. 9 Vol A
	:RP	:Pressure reporting practice M=mean sea level pressure (hPa) reported. S=Station level pressure reported. 8=Geopotential height (m) of 850 hPa surface reported. 7=Geopotential height (m) of 700 hPa surface reported.
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	:Percentage of observations flagged excluding those with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa	(pressure)
SELECTION CRITERIA	:NOBS	≥ 20 ,and one or more of the following:
	1.|bias|	≥ 4 hPa
	2. SD	≥ 6 hPa
	3.PGE	≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60010	28.3N	16.5W	2367	S7	85	2	2	20	1.9	-7.3	7.5
60445	36.2N	5.4E	1081	S8	107	1	1	0	0.8	5.0	5.1
60468	35.6N	6.2E	1052	S8	79	78	99	0	0.0	0.4	0.4
60511	35.3N	1.4E	1127	S8	108	58	54	0	0.4	14.3	14.3
60535	34.7N	3.3E	1144	S8	77	0	0	0	1.0	-5.2	5.3
60670	24.6N	9.5E	1054	S8	84	0	0	0	0.9	9.1	9.1
63330	13.5N	39.5E	2070	MS	51	51	100	0			
63334	10.3N	37.7E	2515	MS	46	0	0	0	0.9	10.3	10.3
63402	7.7N	36.8E	1725	MS	93	0	0	1	1.2	6.8	6.9
63450	9.0N	38.8E	2354	MS	36	0	0	0	0.7	4.2	4.3
63471	9.6N	41.9E	1260	MS	89	2	2	1	2.3	9.2	9.5
63478	5.9N	43.6E	295	MS	56	0	0	0	1.1	6.5	6.6
63602	3.1N	30.9E	1204	S	37	37	100	0			
68030	18.5S	25.6E	1071	8	63	0	0	22	0.8	4.4	4.5
68396	26.5S	31.3E	641	S8	55	0	0	0	0.9	4.5	4.6

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
30320	56.9N	105.7E	669	MS	122	62	51	0	1.3	0.9	1.6
38069	44.2N	66.8E	153	M	108	1	1	0	1.0	-7.2	7.3
40743	36.2N	57.7E	941	MS	114	1	1	1	0.9	-5.0	5.1
40762	35.3N	59.2E	1333	MS	111	4	4	0	1.3	-13.0	13.1
41254	23.1N	57.7E	1755	S8	61	61	100	0			
41396	16.0N	48.9E	700	MS	27	0	0	0	0.9	5.3	5.4
41466	13.7N	44.1E	1402	8	27	0	0	37	1.0	-5.5	5.6
41535	34.2N	73.3E	1308	8	47	1	2	4	1.5	-5.6	5.8
44416	28.6N	81.6E	720	MS	64	0	0	6	1.9	4.3	4.7
44477	27.0N	87.4E	1445	S8	73	72	99	0	0.0	5.2	5.2
47022	40.8N	128.2E	1200	S	58	0	0	3	1.9	4.4	4.8
51495	43.5N	91.6E	874	M	122	0	0	0	1.4	8.0	8.1
52602	38.8N	93.4E	2734	S	123	0	0	0	1.1	-4.1	4.2
52955	35.6N	100.8E	3201	S	123	5	4	0	1.1	13.2	13.2
53588	39.0N	113.5E	2898	S	123	123	100	0			
54587	39.1N	123.2E	102	M	109	1	1	0	0.8	-4.0	4.1
56287	30.0N	103.0E	629	M	123	0	0	7	1.0	4.0	4.1
56444	28.5N	98.9E	3488	S	122	12	10	0	0.5	14.0	14.0
56462	29.0N	101.5E	2994	S	121	0	0	0	1.1	9.3	9.4

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	128	MS	46	0	0	2	1.8	-5.3	5.6
82336	3.1S	58.4W	40	MS	80	8	10	36	3.0	-8.5	9.0
82586	5.2S	39.3W	212	MS	89	0	0	24	0.7	-4.7	4.8
82704	7.6S	72.7W	170	MS	87	0	0	0	0.8	-4.1	4.2
83214	10.3S	54.9W	285	MS	87	3	3	3	0.9	-7.9	8.0
83235	12.4S	46.4W	604	MS	90	0	0	0	0.5	6.5	6.5
83319	14.7S	52.4W	315	MS	87	0	0	2	1.4	-5.3	5.5
83332	14.1S	46.4W	826	MS	91	8	9	1	2.0	13.6	13.7
83376	15.9S	49.0W	740	MS	92	0	0	0	0.6	-4.1	4.1
83408	14.3S	43.8W	447	MS	84	0	0	0	0.8	10.3	10.3
83423	16.7S	49.3W	741	MS	92	0	0	0	0.6	-4.8	4.8
83488	17.8S	42.9W	1097	MS	92	92	100	0			
83531	18.6S	46.5W	940	MS	90	0	0	0	0.8	-7.7	7.7
83587	19.9S	43.9W	850	MS	91	0	0	0	0.8	-7.0	7.0
83773	23.1S	48.9W	793	S	45	0	0	0	1.0	-10.2	10.2
83836	25.5S	50.6W	837	MS	93	0	0	0	0.7	-5.0	5.0
84401	5.2S	80.6W	49	MS	80	0	0	1	1.2	4.8	4.9
84455	6.5S	76.4W	281	MS	60	0	0	0	1.0	5.0	5.1
84472	7.1S	78.5W	2620	S	34	1	3	3	0.8	-6.0	6.1

84501	8.1S	79.0W	26	MS	83	0	0	0	1.0	4.2	4.3

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
84686	13.6S	72.0W	3248	S	80	0	0	0	1.2	-5.5	5.6
84720	14.9S	75.0W	567	MS	56	1	2	2	1.0	5.2	5.3
84782	18.1S	70.3W	468	MS	85	0	0	0	1.1	8.2	8.3
85312	19.8S	63.9W	992	S	49	6	12	6	1.8	-12.5	12.6
85406	18.3S	70.3W	55	M	111	0	0	0	1.0	5.6	5.7
85432	22.5S	68.9W	2320	S8	84	1	1	0	1.0	4.7	4.8
85836	43.6S	71.8W	277	M	40	0	0	0	2.3	4.6	5.1

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
72376	36.8N	108.2W	1677	M	122	0	0	0	1.2	7.7	7.8
76118	30.4N	109.7W	1040	MS	41	0	0	2	0.7	-9.0	9.0
76632	20.1N	98.7W	2417	MS	24	0	0	0	0.4	-5.5	5.5
76658	19.2N	103.7W	494	MS	41	0	0	0	1.0	6.8	6.9
76750	18.5N	88.3W	9	MS	105	0	0	2	1.9	-7.8	8.0
76775	17.1N	96.7W	1550	MS	61	2	3	2	2.5	4.4	5.1
76845	16.7N	92.6W	2276	MS	67	67	100	0			
78718	14.4N	87.6W	626	MS	59	42	71	0	0.2	-14.7	14.7

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
91163	21.9N	159.6W	7	8	358	358	100	0			
95909	36.5S	148.3E	1957	MS	121	121	100	0			
96505	3.7N	115.7E	915	S8	26	26	100	0			
96751	6.7S	106.9E	920	S8	73	4	5	0	2.0	-4.2	4.7

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
01360	61.9N	7.9E	712	MS	123	0	0	0	0.7	5.4	5.4
04207	81.7N	59.9W	105	MS	83	1	1	1	1.7	-4.3	4.6
13593	41.3N	22.4E	1031	8	43	0	0	2	1.5	-4.1	4.4
16227	41.9N	13.6E	655	MS	369	369	100	0			
17042	41.4N	41.4E	33	M	102	0	0	12	1.1	4.5	4.6
17092	39.8N	39.5E	1218	S8	123	0	0	0	1.4	6.3	6.5
17203	38.9N	40.5E	1177	S8	107	0	0	0	0.8	4.2	4.3

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89108	89.0S	1.0W	2755	S	286	0	0	6	2.2	4.9	5.4
89272	75.0S	70.8W	1395	S	245	65	27	0	1.8	-12.2	12.3
89744	74.0S	43.0E	3353	S	261	0	0	0	1.5	8.7	8.8
89774	73.4S	76.8E	2563	S	287	0	0	0	1.7	4.4	4.7
89816	66.8S	112.8E	1375	S	240	0	0	1	2.5	-4.2	4.9

TABLE 4

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: August 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :70.0 - 500.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP ≥ 20

NB: US ACARs and ADS data are shown at the bottom of the table as US ACAR and ADS respectively.

		TEMPERATURE					WIND				
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAA	90	2	32	1.7	0.7	88	1	31	0	8.0	2.4
AAH	110	1	14	1.3	0.5	110	0	13	0	7.3	0.9
AAL	6495	0	17	1.5	0.1	6488	0	17	0	7.6	1.0
AAR	1948	0	8	1.6	-0.6	1902	0	9	0	8.2	0.7
ACA	2506	1	4	1.8	-0.2	2525	0	4	0	7.1	1.0
ACI	60	3	55	1.1	0.3	58	0	53	0	9.0	2.9
ADB	30	0	23	1.7	-1.0	32	0	28	0	10.8	4.9
AEA	571	1	6	2.2	0.9	530	0	5	0	8.1	1.8
AEL	996	1	14	2.0	0.3	1029	0	14	0	7.0	0.7
AEY	76	1	5	2.0	1.0	78	0	6	0	8.4	1.0
AFL	576	1	5	2.3	0.5	573	0	6	0	7.5	0.9
AFR	2095	1	10	1.7	0.2	2123	0	10	0	7.8	1.0
AIH	343	1	4	1.8	0.2	342	0	3	0	6.8	0.8
AJM	145	0	6	1.3	-0.3	144	0	7	0	7.5	0.7
AMM	126	1	3	1.3	0.4	124	0	3	0	5.9	0.3
AMT	1359	1	41	2.2	0.6	1359	0	40	0	6.1	0.7
AMX	358	2	6	1.7	0.2	363	0	7	0	10.9	2.0
ANA	1571	0	7	1.7	-0.1	1541	0	7	0	8.2	0.8
ANC	29	0	0	0.9	-0.3	29	0	0	0	8.3	3.1
ANZ	4654	2	43	1.6	-0.2	4573	0	43	0	7.3	0.7
AOM	1072	1	10	1.9	1.0	1091	0	8	0	7.0	0.7
ARG	46	0	22	2.2	0.0	45	0	20	0	8.5	1.7
ASY	22	0	36	1.2	0.5	22	0	36	0	5.1	0.2
AVA	661	1	4	1.8	0.4	661	0	5	0	8.2	1.1
AVE	345	1	4	2.0	1.1	341	0	6	0	9.5	1.5
AVN	118	3	36	1.1	0.5	116	2	36	0	10.7	-1.5
AXF	95	16	49	1.3	-0.3	80	0	43	0	11.9	3.8
AZA	706	1	7	2.2	0.5	724	0	7	0	8.5	1.1
BAL	431	0	11	1.4	-0.3	438	0	13	0	7.2	0.8
BAW	1802	0	9	2.0	-0.3	1815	0	9	0	7.4	1.0
BBB	33	0	6	2.6	-1.4	31	0	10	0	6.1	0.3
BLX	42	0	5	1.4	-0.2	46	0	7	0	7.2	2.1
BWA	365	3	7	2.1	1.4	365	0	4	0	7.5	1.3
CAL	630	1	6	1.6	0.2	631	0	6	0	9.0	0.4
CCA	275	1	11	2.5	0.3	302	0	64	0	10.6	1.0
CDN	2652	0	7	1.7	0.1	2625	0	8	0	8.5	0.8
CES	351	1	6	1.5	0.3	368	0	8	0	9.9	0.3
CFG	1124	0	4	1.8	-0.4	1113	0	4	0	6.9	0.8
CKS	407	1	43	1.6	0.8	432	0	43	0	6.1	1.1
CKT	271	1	5	1.9	1.3	256	0	4	0	7.3	0.7
CLX	478	0	6	2.1	-0.3	486	0	8	0	8.7	0.8
CMI	532	0	3	1.7	0.6	513	0	3	0	8.5	2.3
CMM	954	1	6	1.7	0.1	951	0	7	0	6.9	0.9
COA	1608	1	17	1.5	0.3	1621	0	20	0	10.5	1.8
CPA	54	0	2	1.8	0.4	58	0	2	0	8.4	1.0
CRL	1094	0	7	1.8	0.7	1094	0	8	0	7.7	1.3
CSA	28	4	14	3.2	-1.5	29	0	7	0	8.8	0.6
CSN	53	0	6	2.0	1.1	56	0	7	0	9.0	-0.3
CTB	237	1	2	1.7	-0.2	241	0	2	0	6.0	1.2
CTM	63	0	22	2.2	-0.3	65	0	18	0	7.7	1.3
CUB	627	4	10	2.3	1.3	625	0	8	0	8.7	1.6
DAL	4605	0	27	1.6	0.3	4650	0	28	0	6.8	0.8
DBY	851	0	3	1.3	-0.2	857	0	5	0	7.4	1.0
DLH	3137	0	8	1.9	-0.1	3121	0	8	0	7.5	1.1
EEZ	81	2	9	1.0	0.2	81	1	12	0	8.5	2.6
EIA	421	1	40	1.4	0.7	419	1	41	0	7.9	0.4
EIN	29	0	3	2.5	-0.5	29	0	0	0	7.5	1.4
ELY	170	1	5	1.8	-0.1	177	0	3	0	7.2	1.3
ETH	21	0	29	2.2	0.5	23	0	26	0	6.8	1.2

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
EVA	2282	0	4	1.4	-0.3	2259	0	4	0	7.7	0.5
EWW	101	0	15	1.7	0.7	107	0	16	0	10.8	1.2
FDX	1774	0	16	1.5	0.6	1771	0	17	0	7.8	0.7
FIN	604	0	4	2.1	0.4	594	0	5	0	8.0	0.6
FJI	1366	9	44	1.9	0.6	1242	0	39	0	9.0	0.2
FOM	292	17	49	2.2	-0.5	249	1	38	0	8.1	1.4
FWQ	50	2	54	2.2	0.0	48	0	52	0	5.9	1.2
GAF	40	3	8	1.8	-0.8	40	0	10	0	7.0	2.0
GCO	63	8	22	2.4	1.0	70	0	24	0	16.9	4.9
GHA	81	0	5	1.8	0.1	81	0	4	0	8.0	1.6
GIA	37	5	30	1.5	0.9	37	0	24	0	5.3	1.5
GRL	68	0	0	1.3	-0.4	69	0	1	0	7.4	1.5
GTI	66	0	6	1.9	0.2	71	1	11	0	13.2	0.9
HAL	3576	1	36	1.4	0.4	3559	0	37	0	8.4	1.2
HLF	148	0	5	1.2	-0.4	144	0	5	0	6.9	0.9
HRH	166	21	73	1.7	0.4	137	0	66	0	8.8	1.3
IBE	3518	1	17	2.0	0.7	3478	0	17	0	7.8	1.1
ICE	1206	2	4	1.8	0.1	1190	0	3	0	6.9	0.9
IWD	297	0	4	1.0	-0.3	294	0	7	0	8.4	1.0
JAL	8005	0	4	1.6	0.2	7867	0	5	0	7.9	1.1
JAZ	58	0	3	2.2	1.8	58	0	7	0	7.8	1.9
JKK	258	1	8	1.4	0.4	251	0	9	0	9.0	1.6
KAL	4557	1	9	1.6	-0.3	4466	0	9	0	8.4	0.7
KIW	52	19	60	3.5	3.0	44	0	50	0	7.7	0.9
KLM	3168	0	11	1.6	0.3	3170	0	12	0	7.7	1.2
LAN	47	2	19	3.7	0.4	46	0	15	0	15.1	-2.7
LAP	33	3	9	2.0	0.5	33	0	6	0	10.5	0.9
LDA	135	0	11	1.5	0.1	132	0	14	0	10.2	-0.2
LDI	753	1	12	1.5	-0.3	760	0	12	0	7.0	0.5
LGL	30	0	13	2.2	-1.3	32	0	16	0	6.9	2.6
LIB	414	1	5	1.9	1.1	414	0	5	0	7.6	1.0
LOT	383	0	7	2.1	-1.3	383	0	6	0	8.3	0.2
LPR	20	0	0	2.9	0.0	20	0	0	0	9.3	1.4
LTU	775	0	6	1.4	-0.1	770	0	6	0	7.0	0.9
LXR	148	1	10	1.7	1.1	148	0	11	0	7.2	2.1
MAH	25	0	12	3.1	-1.9	26	0	8	0	9.8	2.1
MAS	509	0	6	1.6	0.0	534	0	7	0	8.6	0.7
MON	267	1	4	2.0	-0.1	269	0	4	0	9.1	1.0
MPD	649	1	5	1.8	0.8	650	0	6	0	8.1	1.1
MPH	906	1	6	1.7	-0.5	906	0	6	0	7.2	0.7
NCA	581	1	5	1.9	0.2	568	0	4	0	8.1	0.7
NWA	11646	1	10	1.7	0.6	11317	0	10	0	7.8	0.7
OAE	191	0	42	0.9	0.1	190	0	42	0	5.4	0.7
OAL	27	4	7	3.3	2.1	25	0	4	0	6.2	2.0
PAC	245	1	29	1.8	0.8	247	1	29	0	7.4	1.0
PAL	1051	0	3	1.4	-0.2	989	0	3	0	7.8	0.8
PAO	447	17	61	1.5	0.2	378	0	53	0	7.6	1.6
PAQ	40	3	15	2.7	-1.1	40	0	5	0	9.1	0.1
QFA	2526	1	54	1.7	0.2	2467	0	54	0	7.0	0.7
RAF	74	0	3	1.8	0.8	74	0	4	0	9.3	0.2
RAM	127	0	6	1.5	0.1	128	1	7	0	9.8	-0.4
RCH	472	1	18	2.0	0.9	458	0	23	0	11.0	2.1
RJA	44	7	14	1.6	-0.4	46	0	15	0	10.2	1.3
RKA	123	0	6	1.7	-0.1	123	0	7	0	7.7	2.4
ROY	344	0	4	1.7	-0.3	349	0	4	0	8.2	1.0
RRR	161	1	10	1.7	0.1	160	0	9	0	6.8	1.4
RYN	713	0	42	1.3	0.7	726	0	43	0	5.5	0.6
RZO	170	2	2	1.5	0.0	170	0	1	0	7.4	0.7
SAA	231	1	3	1.6	0.0	229	0	2	0	7.6	1.2

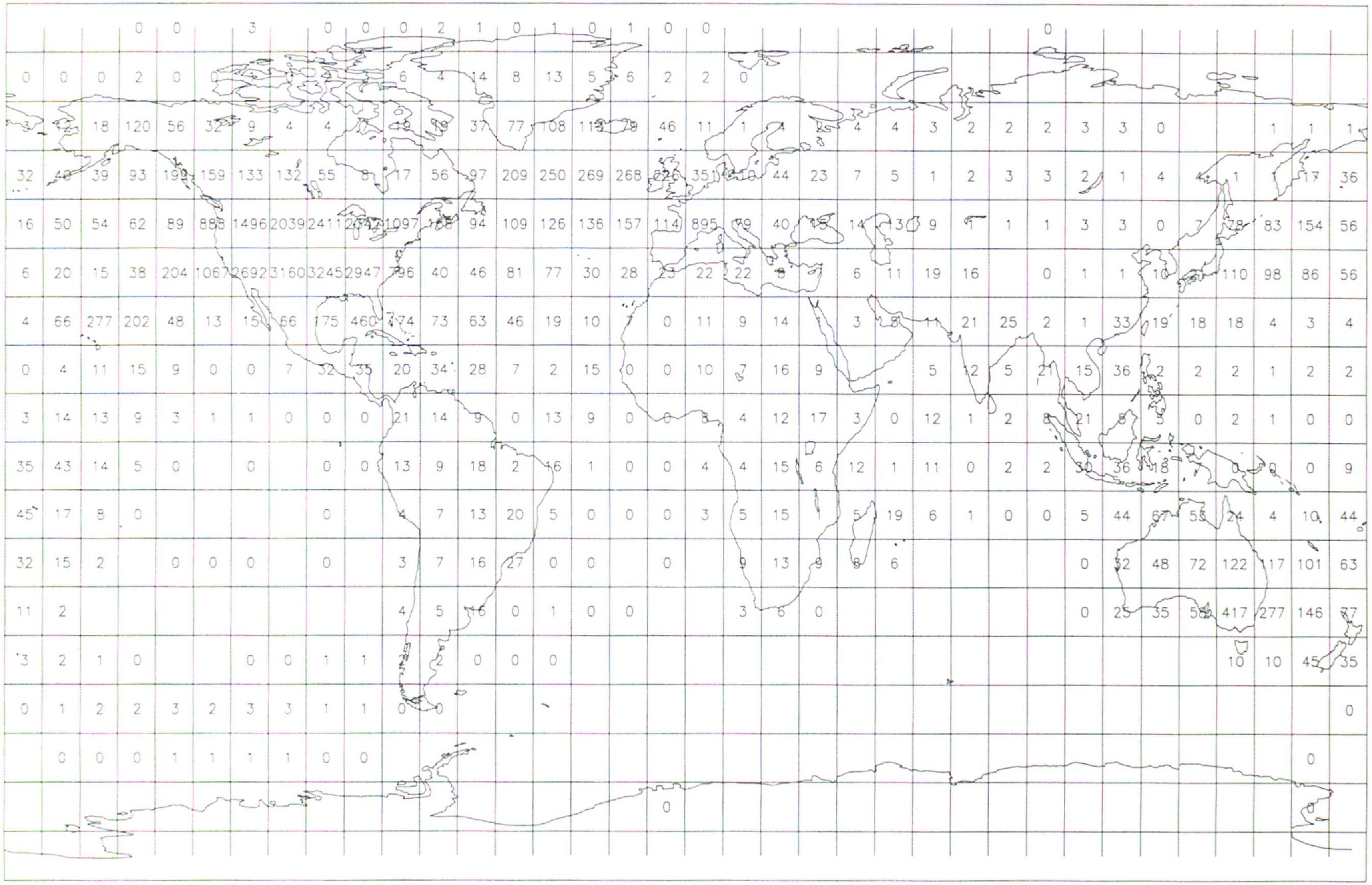
	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
SAB	31	3	6	2.7	0.0	34	0	3	0	6.3	0.4
SAS	1976	0	1	1.8	-0.4	1953	0	2	0	7.2	0.7
SBE	20	5	15	1.3	0.0	20	0	10	0	5.8	0.6
SIA	836	1	7	1.7	-0.1	826	0	7	0	7.3	0.0
SLR	267	0	100	1.7	-0.9	272	0	12	0	8.0	0.9
SOL	59	2	8	1.7	0.9	60	0	7	0	9.5	2.6
SVA	124	2	7	1.9	-0.4	126	0	4	0	6.9	0.3
SWR	112	2	4	1.8	-0.1	114	0	4	0	6.8	1.8
TAP	807	1	7	1.5	0.1	799	0	8	0	8.1	1.3
TBA	25	0	16	2.1	1.0	26	0	19	0	12.5	2.1
TCO	26	4	12	3.0	0.8	28	4	4	0	6.4	0.5
THA	600	1	8	1.7	-0.6	590	1	9	0	8.3	0.6
THT	126	5	32	2.6	0.4	120	0	28	0	7.8	0.6
TOW	251	0	8	1.8	0.1	258	0	9	0	8.5	0.8
TPA	30	0	3	1.3	0.4	30	0	3	0	6.9	0.5
TSC	357	1	4	2.1	0.9	360	0	6	0	8.7	1.1
TWA	1784	0	13	1.6	0.2	1692	0	14	0	7.3	1.2
UAL	99343	0	86	1.1	-0.1	99304	0	86	0	5.3	0.5
UPS	1564	0	29	1.6	0.4	1592	0	30	0	7.4	0.8
USA	380	1	5	1.7	-0.1	315	0	4	0	7.0	1.1
VIR	585	1	4	2.0	-0.3	590	0	5	0	8.6	1.2
VKG	45	0	0	2.0	0.7	45	0	4	0	9.2	2.8
VRG	254	2	29	2.3	0.3	250	0	100	0	12.2	2.7
VSP	33	3	30	2.0	1.4	33	0	30	0	12.2	1.8
VVR	77	3	38	3.4	1.4	78	0	35	0	7.1	1.2
WOA	86	1	7	2.2	0.7	98	1	4	0	7.4	0.8
AN	24261	0	1	1.4	0.2	24260	0	1	0	5.9	0.5
AR	4105	1	100	3.0	2.7	4102	0	1	0	7.1	0.8
BA	35001	0	1	1.5	0.3	34949	0	1	0	6.2	0.9
IT	4062	0	70	1.4	0.5	4016	0	70	0	7.5	0.4
KL	9416	0	6	1.6	1.0	9402	0	6	0	6.0	0.8
LH	2955	0	1	1.9	1.1	2980	0	1	0	6.1	0.8
MK	5421	0	41	2.2	1.8	5408	0	1	0	7.2	0.5
NZ	2915	0	1	1.4	-0.3	2915	0	3	0	5.2	0.4
OZ	57	0	35	1.4	-0.2	57	2	40	0	12.9	2.0
QF	27409	0	3	1.4	0.5	27411	0	3	0	6.1	0.6
SA	3241	1	43	2.5	2.1	3232	0	2	0	7.9	1.2
SK	280	0	0	1.5	-0.3	280	0	0	0	4.9	0.2
SV	82	100	100	46.3	-32.8	79	1	100	0	22.4	15.8
WA	297	15	21	1.8	0.7	294	5	71	0	8.5	-1.9
XX	3136	1	7	1.4	0.4	3937	0	100	0	9.7	1.5
N	621	1	21	2.4	0.9	636	0	21	0	7.9	1.7
ACARS	572110	0	12	1.1	0.3	575900	0	12	0	5.6	0.7

MEAN DAILY COUNT OF AIRCRAFT 70 - 500 HPA

FIGURE 3

AUGUST 1999

OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED


0 0 3 0 0 0 2 1 0 1 0 1 0 0 0
0 0 0 2 0 0 1 4 6 4 14 8 13 5 6 2 2 0
3 12 18 120 56 32 9 4 4 7 19 19 37 77 108 113 79 46 11 1 4 2 4 4 3 2 2 2 3 3 0 1 1 1
32 40 39 93 199 159 133 132 55 8 17 56 97 209 250 269 268 226 351 410 44 23 7 5 1 2 3 3 2 1 4 4 1 1 17 36
16 50 54 62 89 888 1496 2039 2411 2342 1097 168 94 109 126 136 157 114 895 79 40 15 14 13 9 1 1 1 3 3 0 7 78 83 154 56
6 20 15 38 204 1067 2692 3160 3245 2947 796 40 46 81 77 30 28 23 22 22 8 7 6 11 19 16 0 1 1 10 110 98 86 56
4 66 277 202 48 13 15 66 175 460 474 73 63 46 19 10 7 0 11 9 14 1 3 5 11 21 25 2 1 33 19 18 18 4 3 4
0 4 11 15 9 0 0 7 32 35 20 34 28 7 2 15 0 0 10 7 16 9 5 12 5 21 15 36 2 2 2 1 2 2
3 14 13 9 3 1 1 0 0 0 21 14 9 0 13 9 0 0 8 4 12 17 3 0 12 1 2 8 21 8 5 0 2 1 0 0
35 43 14 5 0 0 0 0 13 9 18 2 16 1 0 0 4 4 15 6 12 1 11 0 2 2 30 36 18 7 0 0 0 9
45 17 8 0 0 4 7 13 20 5 0 0 0 3 5 15 1 5 19 6 1 0 0 5 44 67 55 24 4 10 44
32 15 2 0 0 0 0 3 7 16 27 0 0 0 9 13 9 8 6 0 32 48 72 122 117 101 63
11 2 4 5 16 0 1 0 0 3 6 0 0 25 35 58 417 277 146 77
3 2 1 0 0 0 1 1 2 2 0 0 0 10 10 45 35
0 1 2 2 3 2 3 3 1 1 0 0 0
0 0 0 1 1 1 1 0 0 0
0 0

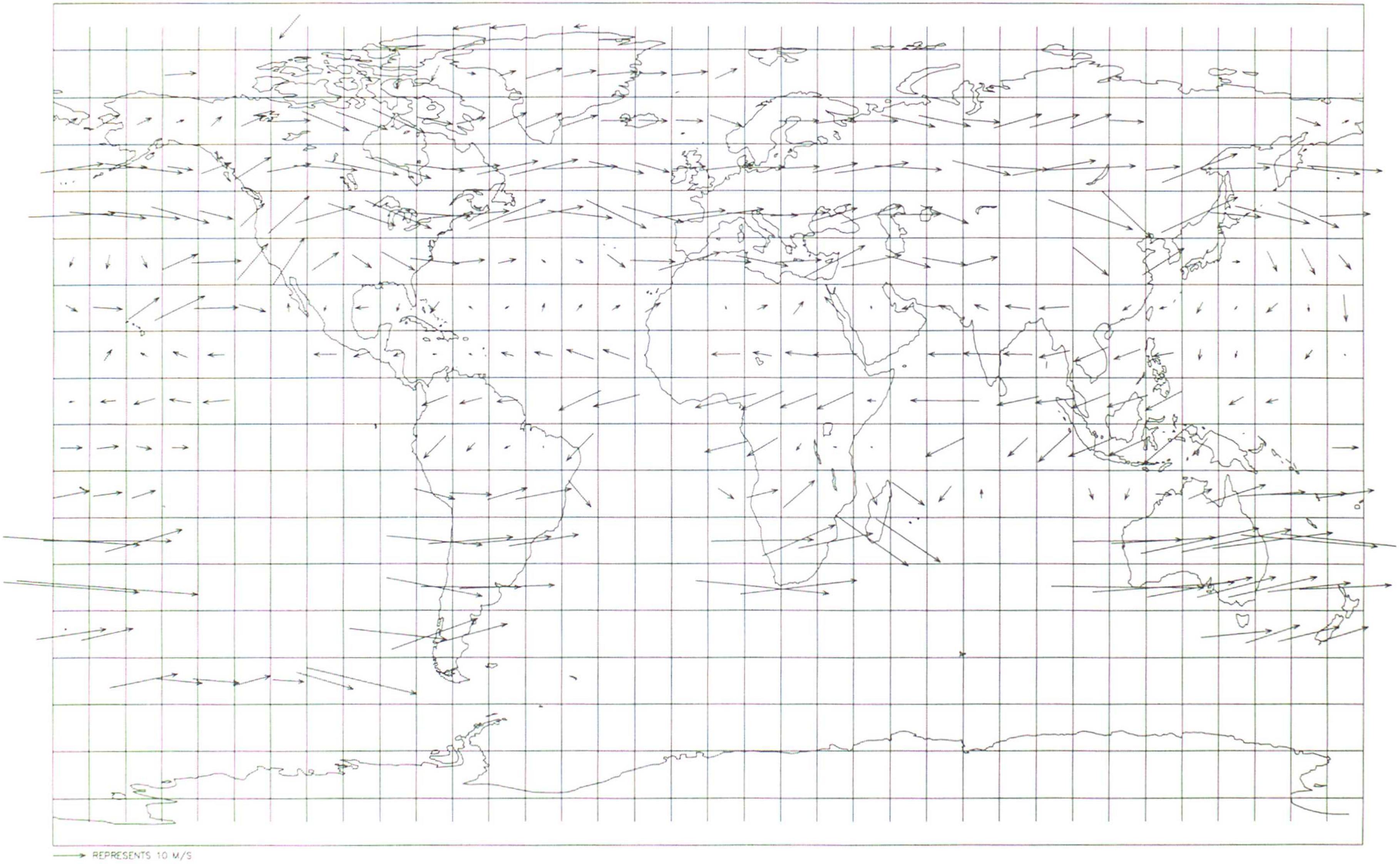
AIRCRAFT MEAN WINDS BETWEEN 70 AND 500 HPA

FIGURE 4

AUGUST 1999

OBSERVATIONS WITH O–B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT



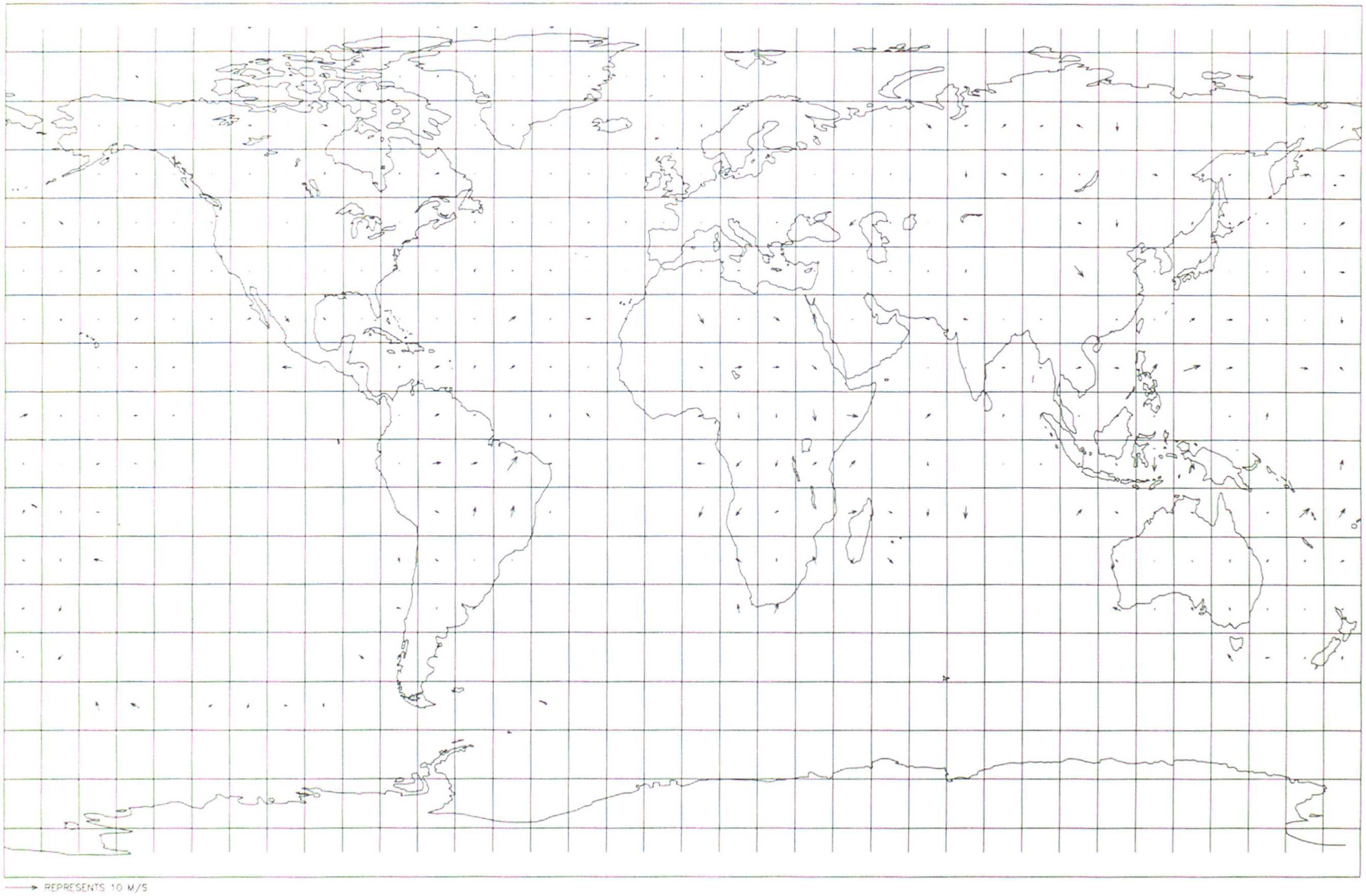
AIRCRAFT MEAN O–B WINDS BETWEEN 70 AND 500 HPA

FIGURE 5

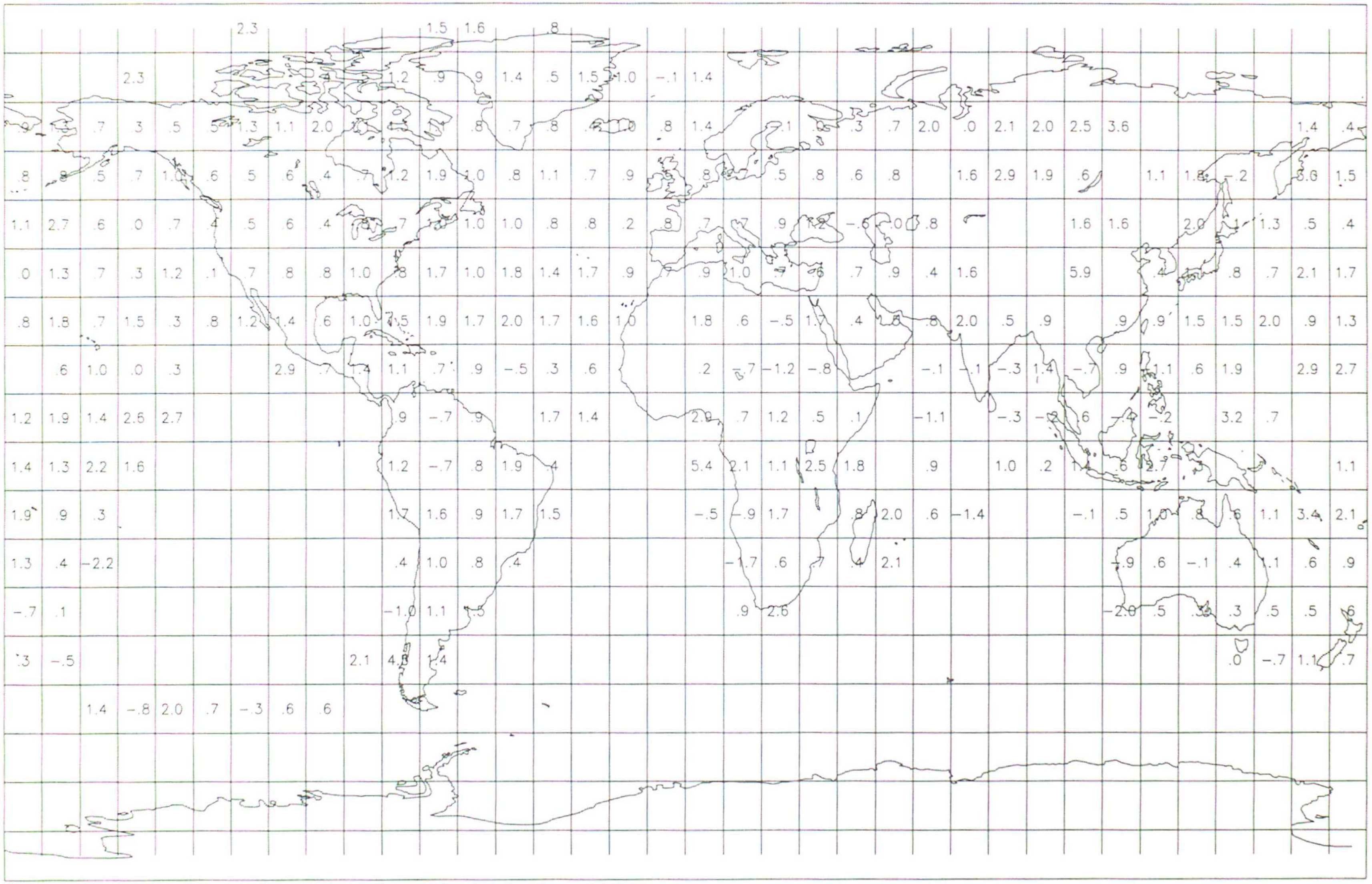
AUGUST 1999

OBSERVATIONS WITH O–B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED

VALUES ARE PRINTED WHERE MORE THAN 30 OBS ARE PRESENT



AIRCRAFT : MEAN O-B SPEEDS (M/S) BETWEEN 70 AND 500 HPA FIGURE 6
AUGUST 1999
OBSERVATIONS WITH O-B VECTOR DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT


2.3 1.5 1.6 .8
2.3 1.2 .9 .9 1.4 .5 1.5 1.0 -.1 1.4
.9 .7 .3 .5 .5 1.3 1.1 2.0 .8 .7 .8 1.0 .8 1.4 .1 .0 .3 .7 2.0 .0 2.1 2.0 2.5 3.6 1.4 .4
.8 .8 .5 .7 1.0 .6 .5 .6 .4 .7 1.2 1.9 1.0 .8 1.1 .7 .9 .8 .5 .8 .6 .8 1.6 2.9 1.9 .6 1.1 1.8 -.2 3.6 1.5
1.1 2.7 .6 .0 .7 .4 .5 .6 .4 .7 1.0 1.0 .8 .8 .2 .8 .7 .7 .9 1.2 -.6 .0 .8 1.6 1.6 2.0 .1 1.3 .5 .4
.0 1.3 .7 .3 1.2 .1 .7 .8 .8 1.0 .8 1.7 1.0 1.8 1.4 1.7 .9 .7 .9 1.0 .7 .6 .7 .9 .4 1.6 5.9 .4 .8 .7 2.1 1.7
.8 1.8 .7 1.5 .3 .8 1.2 1.4 .6 1.0 1.5 1.9 1.7 2.0 1.7 1.6 1.0 1.8 .6 -.5 1.7 .4 .8 .8 2.0 .5 .9 .9 .9 1.5 1.5 2.0 .9 1.3
.6 1.0 .0 .3 2.9 .7 1.4 1.1 .7 .9 -.5 .3 .6 .2 -.7 -1.2 -.8 -.1 -.1 -.3 1.4 -.7 .9 1.1 .6 1.9 2.9 2.7
1.2 1.9 1.4 2.6 2.7 .9 -.7 .9 1.7 1.4 2.9 .7 1.2 .5 .1 -1.1 -.3 -.2 .6 -.4 -.2 3.2 .7
1.4 1.3 2.2 1.6 1.2 -.7 .8 1.9 .4 5.4 2.1 1.1 2.5 1.8 .9 1.0 .2 1.4 .6 2.7 1.1
1.9 .9 .3 1.7 1.6 .9 1.7 1.5 -.5 -.9 1.7 .8 2.0 .6 -1.4 -.1 .5 1.0 .8 .6 1.1 3.4 2.1
1.3 .4 -2.2 .4 1.0 .8 .4 -1.7 .6 .7 .4 2.1 -.9 .6 -.1 .4 1.1 .6 .9
-.7 .1 -1.0 1.1 1.5 .9 2.6 -2.0 .5 .3 .5 .5 .6
.3 -.5 2.1 4.8 1.4 .0 -.7 1.1 .7
1.4 -.8 2.0 .7 -.3 .6 .6

AIRCRAFT : RMS O-B VECTOR (M/S) BETWEEN 70 AND 500 HPA FIGURE 7
AUGUST 1999
OBSERVATIONS WITH O-B VECTOR DIFFERENCE GREATER THAN 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

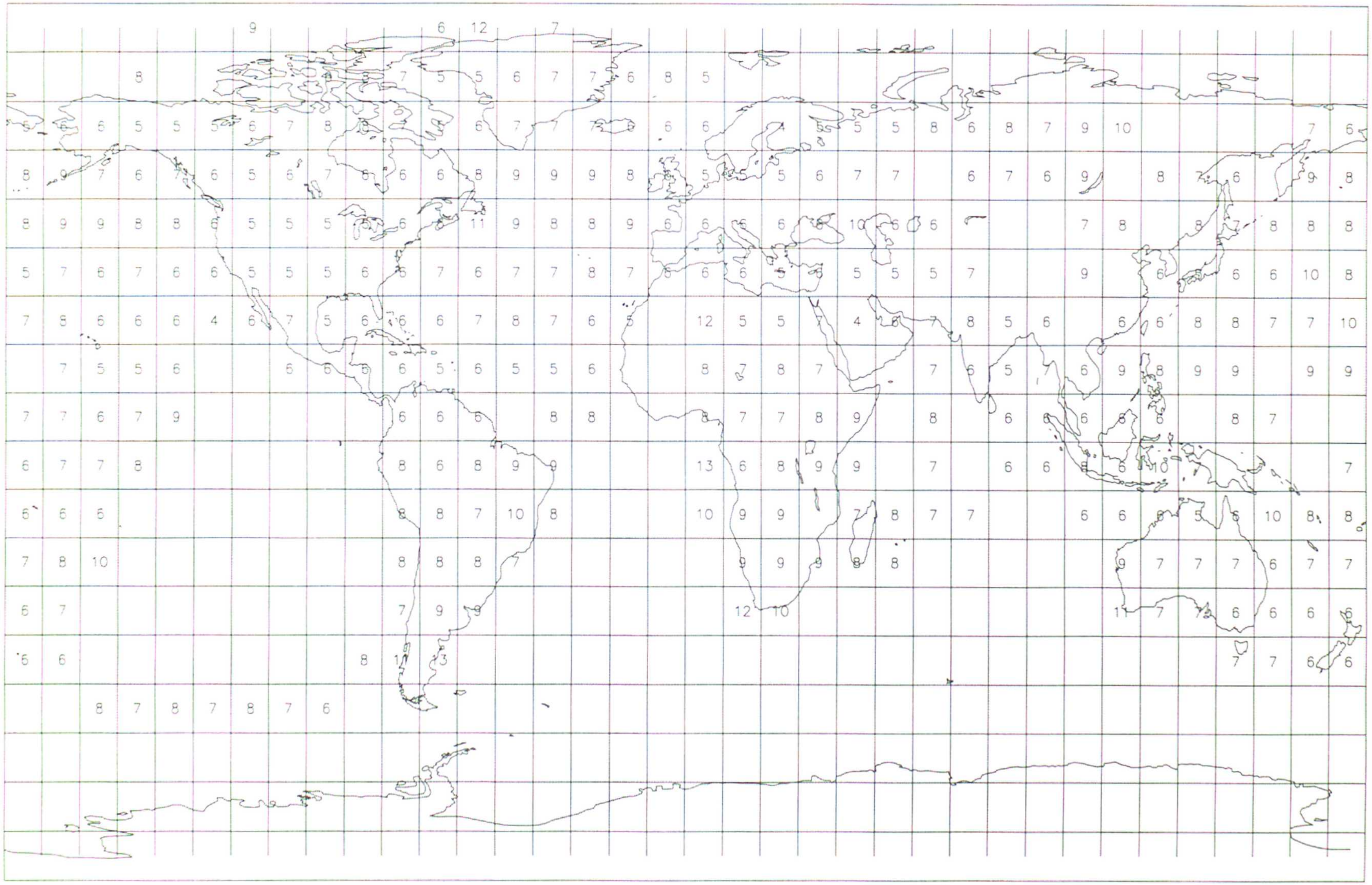


TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: August 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 30.0 hPa
Element monitored		:GEOPOTENTIAL HEIGHT IN metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown duringperiod.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.1	
SELECTION CRITERIA	: ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.	

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
42027	12	Z	150	34/ 75	16	0	61.2	102.3	119.2	6
42182	00	Z	200	29/ 77	26	0	61.0	59.4	85.2	6
42182	12	Z	150	29/ 77	26	0	66.3	110.7	129.0	5
42339	00	Z	150	26/ 73	11	2	105.2	119.4	159.1	6
42339	12	Z	200	26/ 73	13	0	88.3	72.7	114.4	4
42361	00	Z	150	26/ 78	16	0	115.6	76.3	138.5	6
42369	12	Z	100	27/ 81	17	1	103.2	104.8	147.1	5
42379	00	Z	150	27/ 83	21	0	60.5	78.9	99.4	5
42379	12	Z	100	27/ 83	15	0	73.6	121.5	142.1	4
42492	00	Z	150	26/ 85	17	0	65.6	106.3	124.9	5
42492	12	Z	100	26/ 85	14	0	71.5	126.5	145.3	4
42647	12	Z	100	23/ 73	15	0	53.1	158.3	166.9	6
42701	12	Z	100	23/ 85	12	0	114.8	-40.1	121.6	5
42867	00	Z	200	21/ 79	25	0	77.7	38.7	86.9	4
42874	12	Z	100	21/ 82	10	0	85.4	101.4	132.6	4
42971	00	Z	100	20/ 86	19	1	103.9	135.2	170.5	5
42971	12	Z	100	20/ 86	20	1	82.1	116.9	142.8	4
43003	00	Z	100	19/ 73	16	2	59.6	149.6	161.0	6
43003	12	Z	150	19/ 73	7	18	28.8	221.3	223.1	7
43014	12	Z	150	20/ 75	18	1	69.3	108.7	128.9	4
43185	12	Z	100	16/ 81	23	1	89.4	111.3	142.8	6
43192	12	Z	150	15/ 74	15	0	67.2	82.0	106.0	4
43369	00	Z	100	8/ 73	20	0	79.2	-140.3	161.1	6
43369	12	Z	250	8/ 73	27	0	70.6	-25.0	74.9	4
43371	12	Z	100	8/ 77	24	1	65.3	128.9	144.5	4
56294	00	Z	100	31/ 104	30	0	38.1	133.7	139.0	4
56964	12	Z	100	23/ 101	21	0	39.7	140.8	146.3	4
56985	00	Z	100	23/ 103	28	0	35.7	133.5	138.2	4
68240	00	Z	850	-24/ 26	13	0	5.2	42.5	42.9	5
68240	12	Z	850	-24/ 26	11	0	4.1	46.8	47.0	4
82332	12	Z	200	-3/ -60	21	0	86.6	-35.1	93.4	5
89664	00	Z	400	-78/ 167	27	1	35.3	71.5	79.8	6

AVAILABILITY – TEMP – 500 HPA GEOPOTENTIAL – AUGUST 1999

FIGURE 8

ALL HOURS

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS – 1095

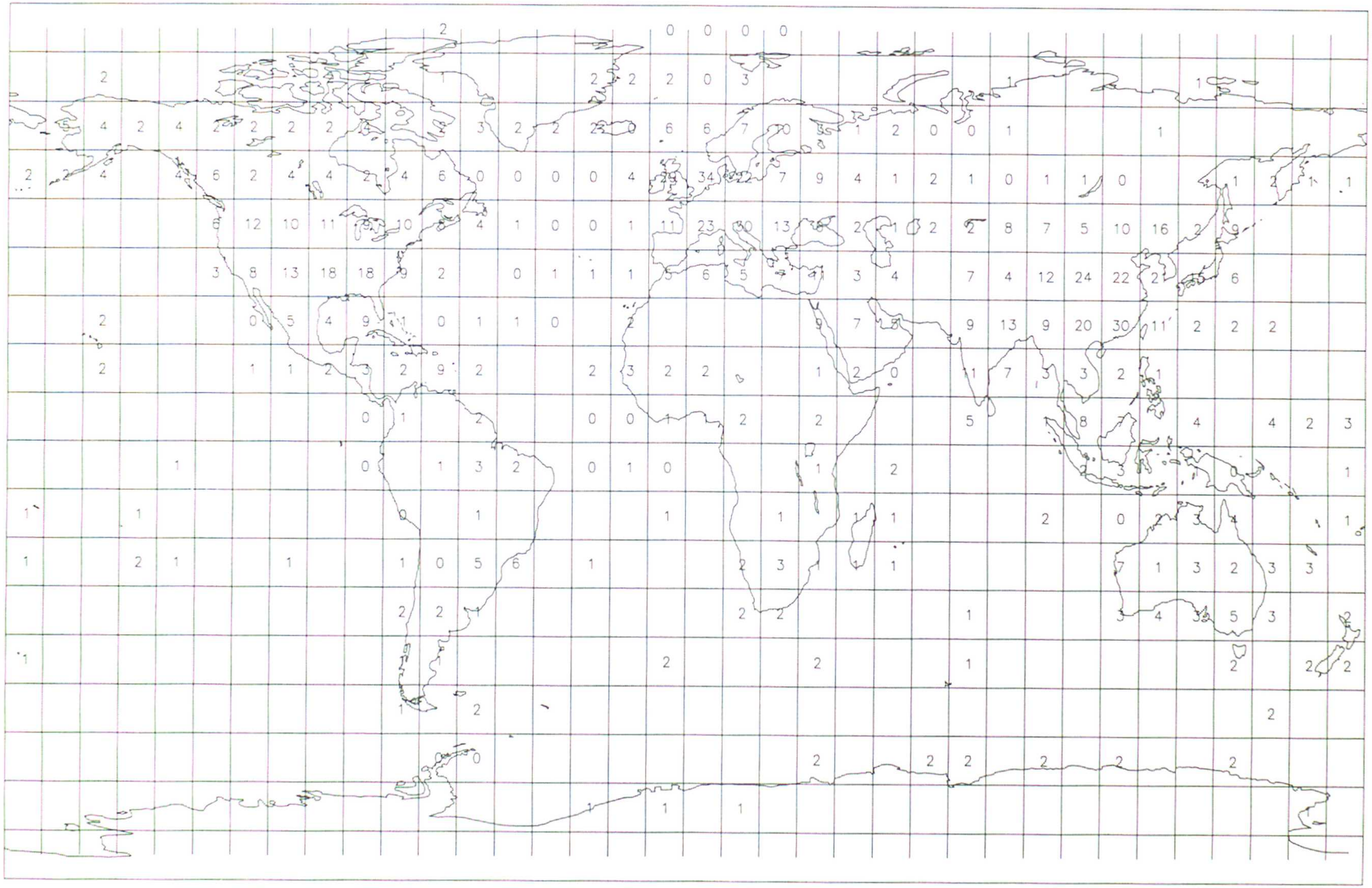

2 0 0 0 0
2 1 2 2 2 0 3 1 1
4 2 4 2 2 2 2 3 2 2 2 6 6 7 0 1 2 0 0 1 1
2 2 4 4 6 2 4 4 2 4 6 0 0 0 0 4 29 34 22 7 9 4 1 2 1 0 1 1 0 1 2 1 1
6 12 10 11 9 10 8 4 1 0 0 1 11 23 30 13 18 2 1 2 2 8 7 5 10 16 2 9
3 8 13 18 18 9 2 0 1 1 1 5 6 5 7 11 3 4 7 4 12 24 22 21 5 6
2 0 5 4 9 1 0 1 1 0 2 9 7 8 9 13 9 20 30 11 2 2 2
2 1 1 2 3 2 9 2 2 3 2 2 1 2 0 11 7 3 3 2 1
0 1 2 0 0 1 2 2 5 8 7 4 4 2 3
1 0 1 3 2 0 1 0 1 2 2 3 0 1
1 1 0 1 1 1 1 1 2 0 2 3 4 1
1 2 1 1 1 0 5 6 1 2 3 1 1 7 1 3 2 3 3
2 2 1 2 2 1 3 4 3 5 3 2
1 2 2 1 2 2 2
1 2 2
0 2 2 2 2 2 2
1 1 1

TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: August 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 100.0 hPa
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored		
	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.2	
SELECTION CRITERIA	: ≥ 10 observations and ≥ 15 m s^{-1} RMS vector wind.	

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
48568	12	V	150	7/ 101	19	0	31	16.2	9.6	19.6	1
68110	00	V	250	-23/ 17	12	0	16	-8.4	-9.4	16.8	1

AVAILABILITY – TEMP/PILOT – 300 HPA WIND – AUGUST 1999 FIGURE 9
ALL HOURS
10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS
GLOBAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS – 1183

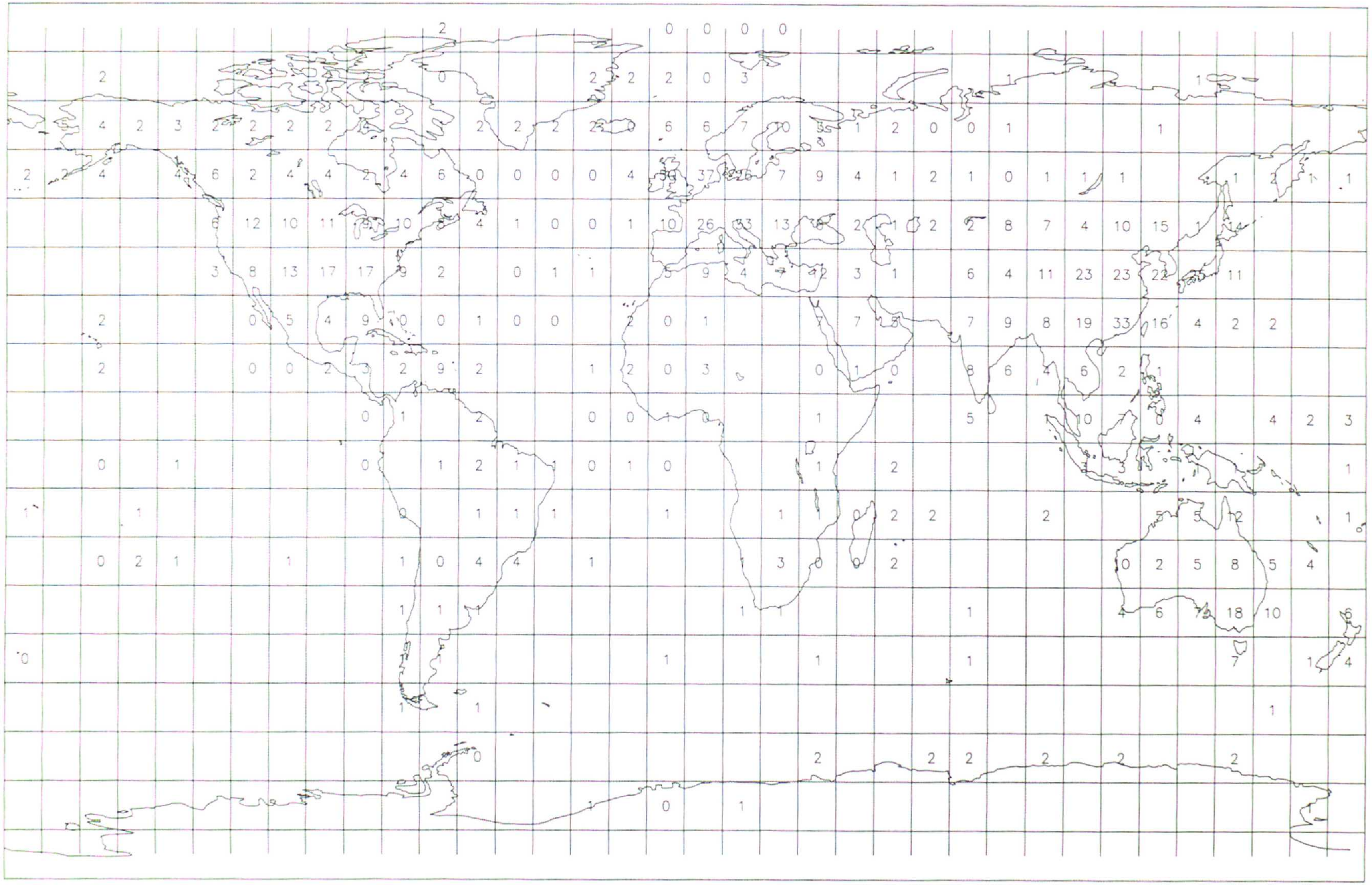


TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: August 1999

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from each unique identifier for radiosonde TEMPs.
Area monitored	:90°N - 90°S, 180°W - 180°E.
Standard of comparison	:Background field from UKMO global model.
Observation times	:00 UTC and 12 UTC.
Level(s) monitored	:Standard levels between 500.0 - 150.0 hPa
Element monitored	:WIND DIRECTION in degrees

Parameters monitored

:NUM OBS	:Average number of observations at all levels.
:BIAS	:Mean difference of observations from background values from all levels.
:MAX SPREAD	:(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels
:SD	:SD of difference of observations from background values at all levels.

SELECTION CRITERIA :NUM OBS ≥ 5, and
ABSOLUTE BIAS $\geq 10°$, with
SD $< 30°$, and
MAX SPREAD $< 10°$

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
08594	00	DD	17/ -23	15	-10.2	3.5	16.9
17240	00	DD	38/ 31	22	-20.3	6.8	15.3
17240	12	DD	38/ 31	24	-19.5	4.4	12.1
17280	00	DD	38/ 40	27	-13.2	4.8	10.8
17280	12	DD	38/ 40	26	-10.6	7.5	13.1
33791	12	DD	48/ 33	22	-21.1	1.6	25.8
42182	12	DD	29/ 77	16	-12.2	7.5	28.1
42809	12	DD	23/ 88	15	11.5	7.6	17.1
43369	00	DD	8/ 73	17	13.1	6.9	20.9
62337	00	DD	31/ 34	23	-16.8	2.9	12.3
62337	12	DD	31/ 34	22	-15.2	5.0	12.9
72376	00	DD	37/-108	24	-11.6	7.4	23.1
78384	12	DD	19/ -81	14	-11.0	8.7	23.0
78866	00	DD	18/ -63	14	-14.4	7.4	21.3
78866	12	DD	18/ -63	12	-14.9	7.0	22.5

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: August 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from GOES, METEOSAT, GMS, INSAT.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :number of observations > 10.

Data Extracted :Layer 701 - 1000 hPa
401 - 700 hPa
101 - 400 hPa

:Mean wind

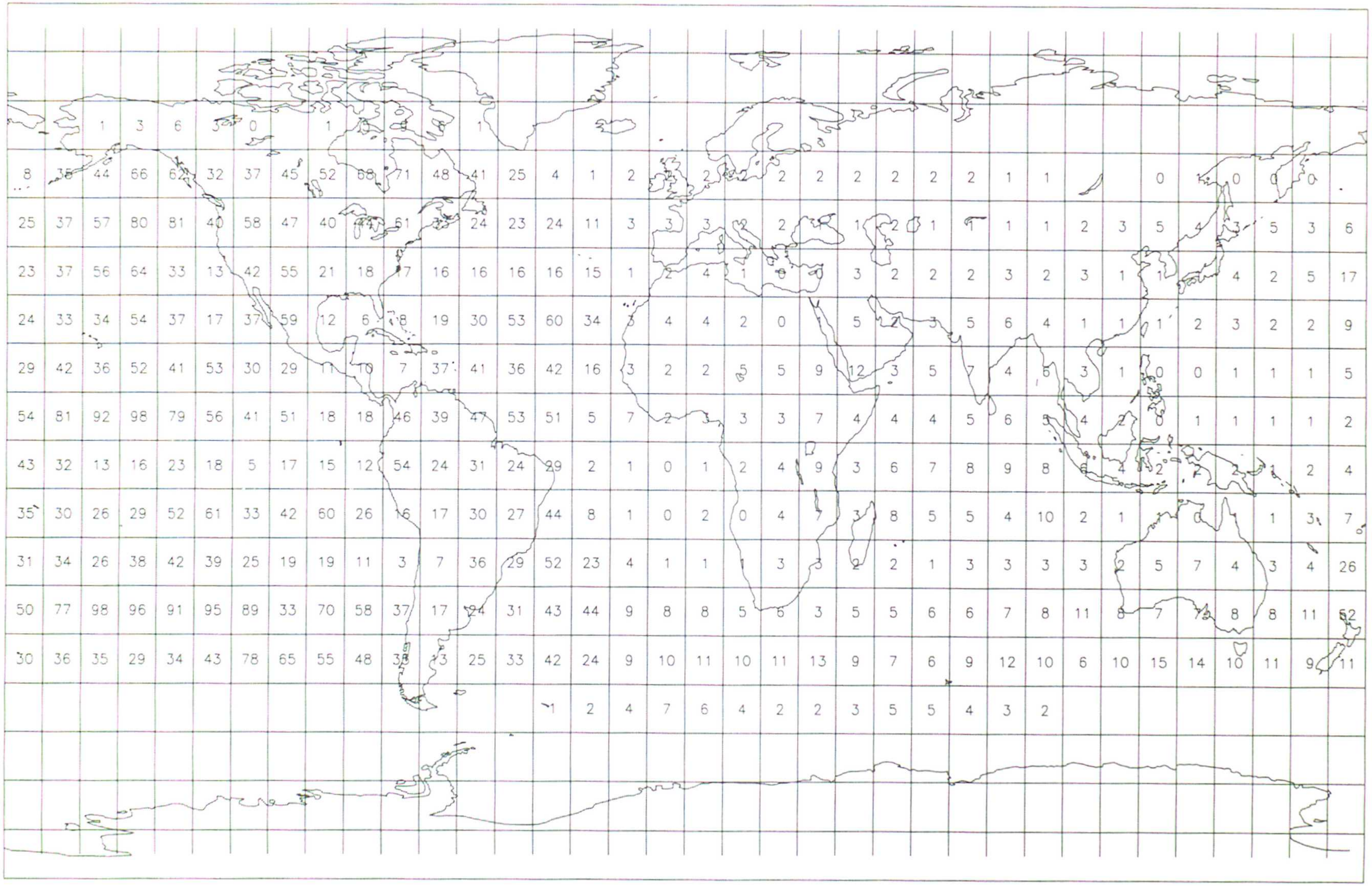
:Mean observation minus background vector wind differences

:Mean observation minus background speed differences

:RMS of observation minus background vector differences

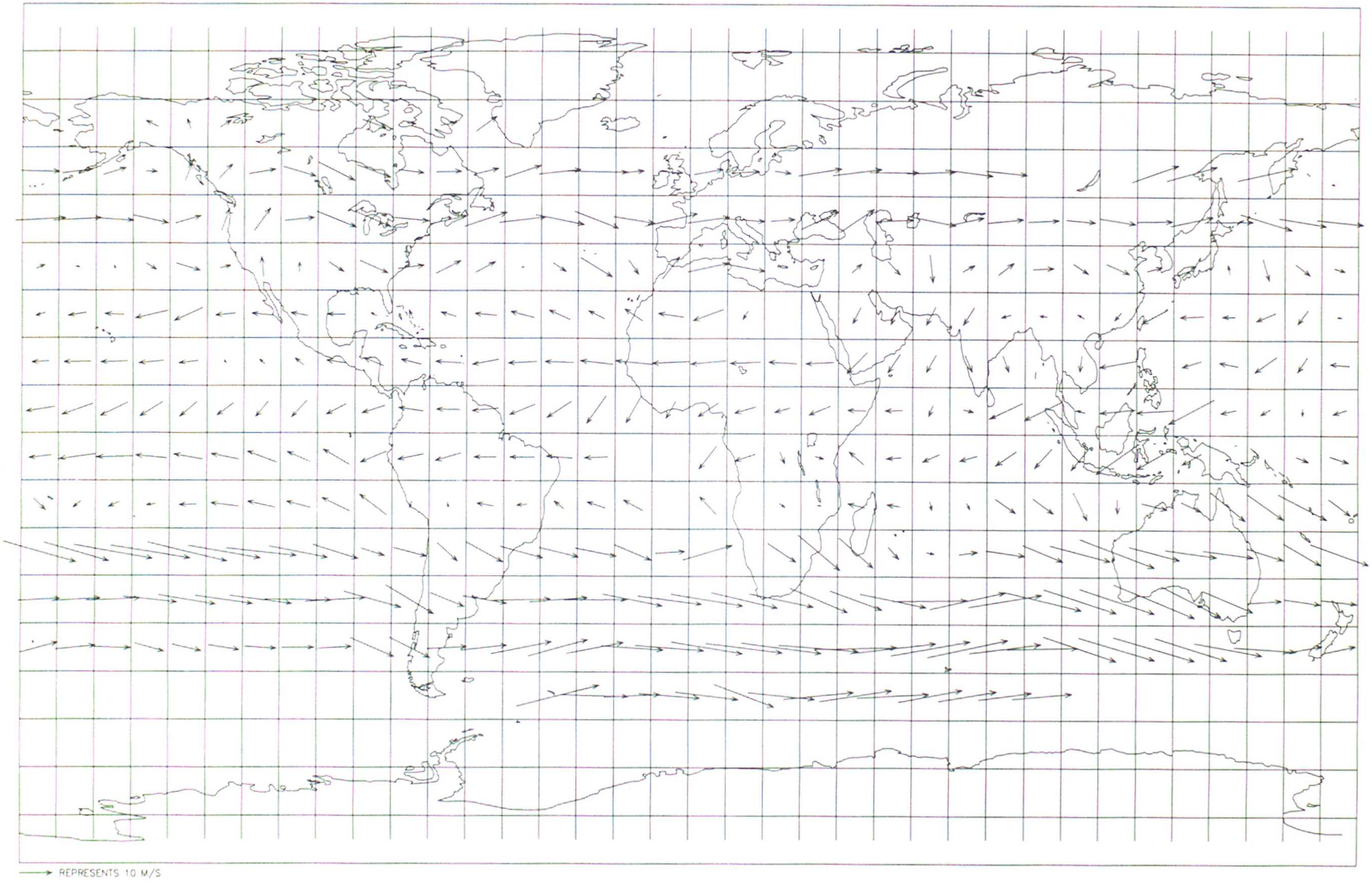
NOTE. Diagrams for the layer 701 - 1000 hPa are not available this month.

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 401 AND 700 HPA FIGURE 15
AUGUST 1999


1 3 6 3 0 1 0 3 6 1
8 35 44 66 62 32 37 45 52 68 71 48 41 25 4 1 2 2 2 2 2 2 2 2 2 2 1 1 0 1 0 0 0
25 37 57 80 81 40 58 47 40 44 61 33 24 23 24 11 3 3 3 2 2 1 1 2 1 1 1 1 2 3 5 4 3 5 3 6
23 37 56 64 33 13 42 55 21 18 17 16 16 16 16 15 1 2 4 1 0 0 3 2 2 2 3 2 3 1 1 4 2 5 17
24 33 34 54 37 17 37 59 12 6 8 19 30 53 60 34 3 4 4 2 0 1 5 2 3 5 6 4 1 1 1 2 3 2 2 9
29 42 36 52 41 53 30 29 11 10 7 37 41 36 42 16 3 2 2 5 5 9 12 3 5 7 4 5 3 1 0 0 1 1 1 5
54 81 92 98 79 56 41 51 18 18 46 39 47 53 51 5 7 2 3 3 3 7 4 4 4 5 6 5 4 2 0 1 1 1 1 2
43 32 13 16 23 18 5 17 15 12 54 24 31 24 29 2 1 0 1 2 4 9 3 6 7 8 9 8 6 4 2 2 2 1 2 4
35 30 26 29 52 61 33 42 60 26 16 17 30 27 44 8 1 0 2 0 4 7 3 8 5 5 4 10 2 1 1 0 1 1 3 7
31 34 26 38 42 39 25 19 19 11 3 7 36 29 52 23 4 1 1 1 3 3 2 2 1 3 3 3 3 2 5 7 4 3 4 26
50 77 98 96 91 95 89 33 70 58 37 17 24 31 43 44 9 8 8 5 6 3 5 5 6 6 7 8 11 8 7 7 8 8 11 52
30 36 35 29 34 43 78 65 55 48 38 13 25 33 42 24 9 10 11 10 11 13 9 7 6 9 12 10 6 10 15 14 10 11 9 11
1 2 4 7 6 4 2 2 3 5 5 4 3 2

SATOB VECTOR MEAN WINDS BETWEEN 401–700 HPA
AUGUST 1999
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT

FIGURE 16


REPRESENTS 10 M/S

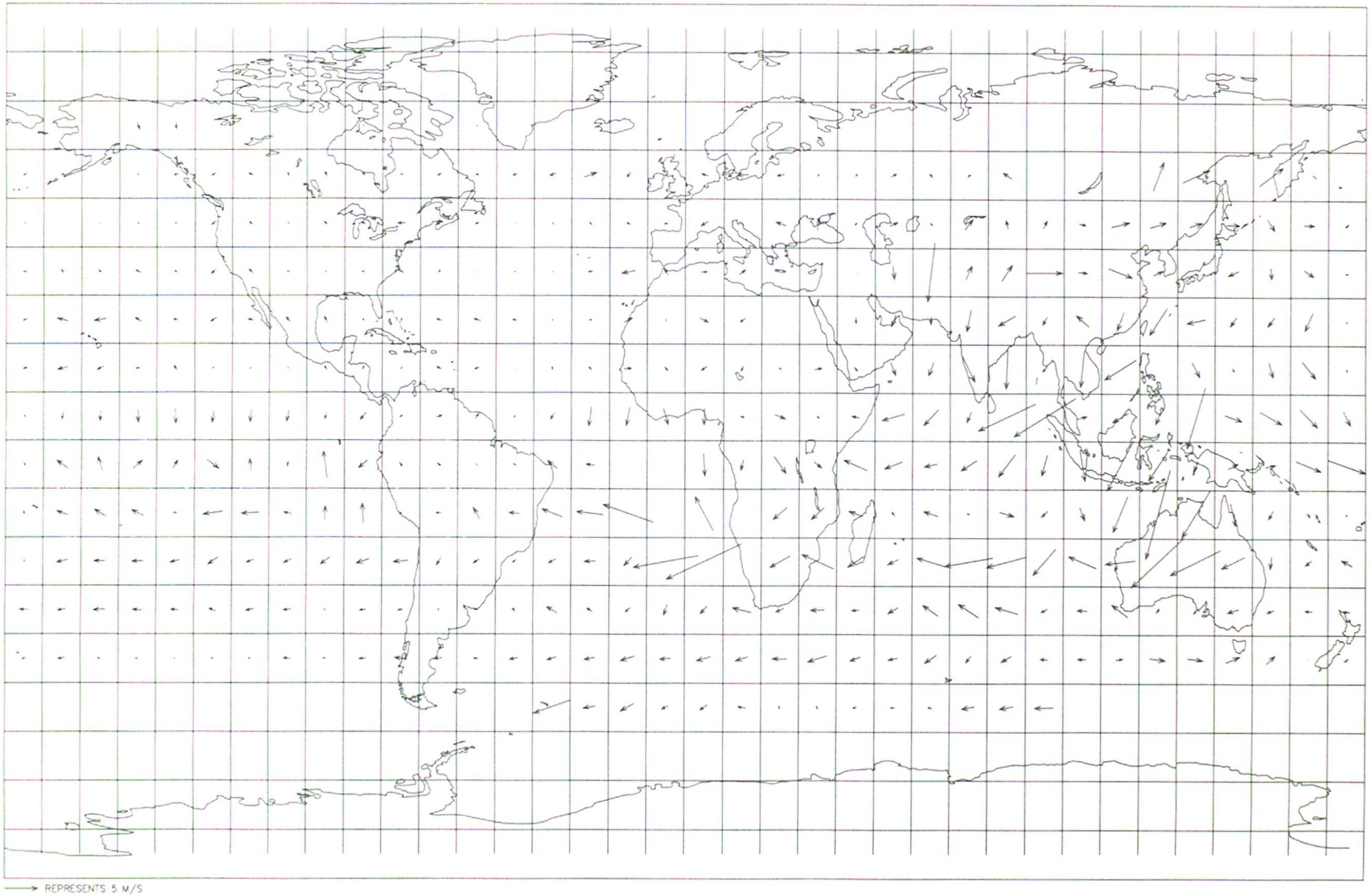
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 401-700 HPA

FIGURE 17

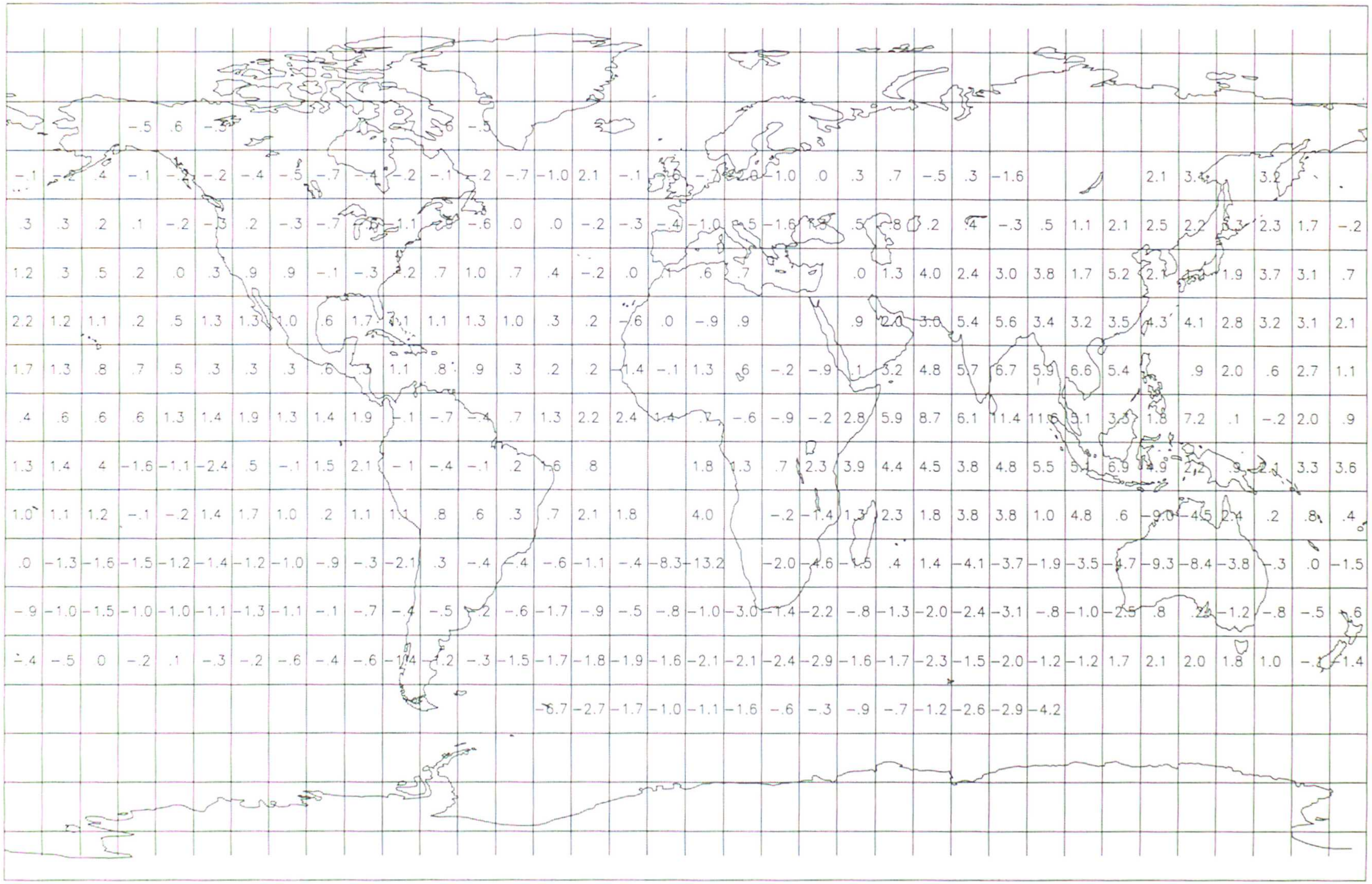
AUGUST 1999

ALL OBSERVATIONS

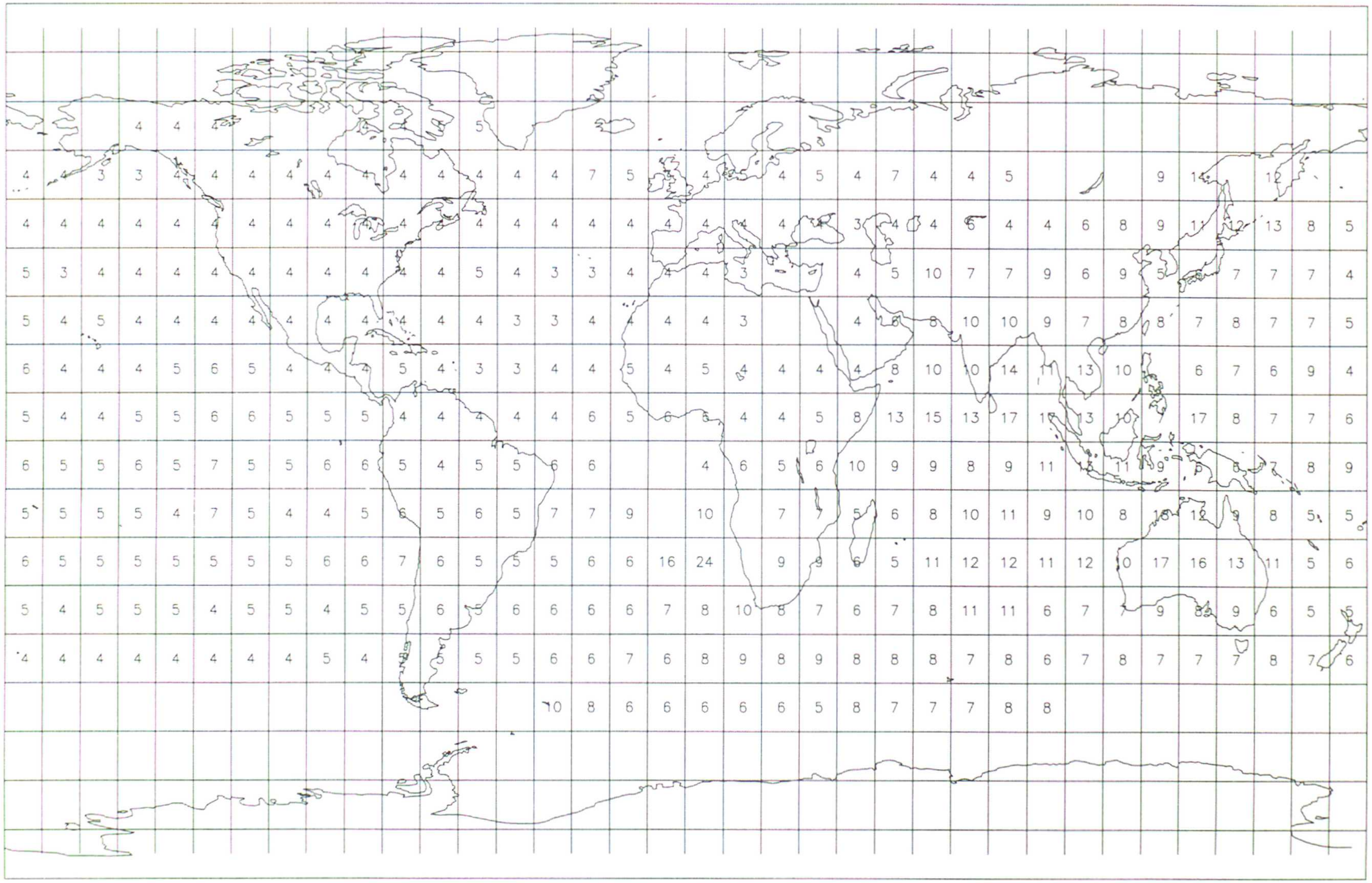
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT



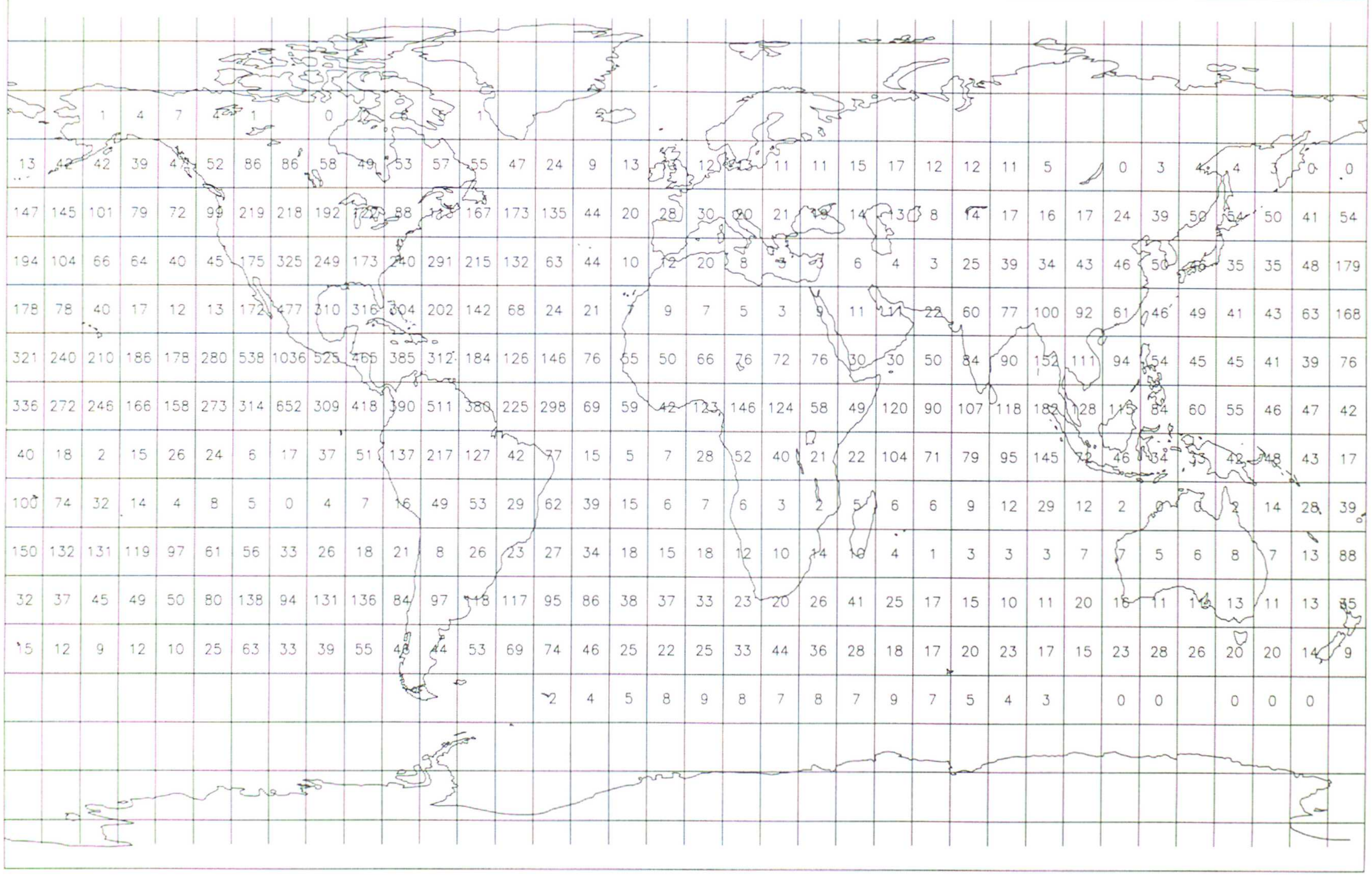
SATOBS : MEAN O–B SPEED DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 18
AUGUST 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


-.5 .6 -.3 .6 -.5
-.1 -.2 .4 -.1 -.1 -.2 -.4 -.5 -.7 -.4 -.2 -.1 .2 -.7 -1.0 2.1 -.1 -.6 -.7 -2.0 -1.0 .0 .3 .7 -.5 .3 -1.6 2.1 3.4 3.2
.3 .3 .2 .1 -.2 -.3 .2 -.3 -.7 -1.1 -.6 .0 .0 -.2 -.3 -.4 -1.0 -.5 -1.6 1.3 .5 -.8 .2 .4 -.3 .5 1.1 2.1 2.5 2.2 2.3 1.7 -.2
1.2 .3 .5 .2 .0 .3 .9 .9 -.1 -.3 .2 .7 1.0 .7 .4 -.2 .0 .1 .6 .7 .0 1.3 4.0 2.4 3.0 3.8 1.7 5.2 2.1 1.9 3.7 3.1 .7
2.2 1.2 1.1 .2 .5 1.3 1.3 1.0 .6 1.7 .1 1.1 1.3 1.0 .3 .2 .6 .0 -.9 .9 .9 2.0 3.0 5.4 5.6 3.4 3.2 3.5 4.3 4.1 2.8 3.2 3.1 2.1
1.7 1.3 .8 .7 .5 .3 .3 .3 .6 .3 1.1 .8 .9 .3 .2 .2 1.4 -.1 1.3 .6 -.2 -.9 .1 3.2 4.8 5.7 6.7 5.9 6.6 5.4 .9 2.0 .6 2.7 1.1
.4 .6 .6 .6 1.3 1.4 1.9 1.3 1.4 1.9 -.1 -.7 -.4 .7 1.3 2.2 2.4 1.4 .7 -.6 -.9 -.2 2.8 5.9 8.7 6.1 11.4 11.6 5.1 3.3 1.8 7.2 .1 -.2 2.0 .9
1.3 1.4 .4 -1.6 -1.1 -2.4 .5 -.1 1.5 2.1 -.1 -.4 -.1 .2 1.6 .8 1.8 1.3 .7 2.3 3.9 4.4 4.5 3.8 4.8 5.5 5.1 6.9 4.9 2.2 .3 2.1 3.3 3.6
1.0 1.1 1.2 -.1 -.2 1.4 1.7 1.0 .2 1.1 1.1 .8 .6 .3 .7 2.1 1.8 4.0 -.2 -1.4 1.3 2.3 1.8 3.8 3.8 1.0 4.8 .6 -9.0 -4.5 2.4 .2 .8 .4
.0 -1.3 -1.6 -1.5 -1.2 -1.4 -1.2 -1.0 -.9 -.3 -2.1 .3 -.4 -.4 -.6 -1.1 -.4 -8.3 -13.2 -2.0 -4.6 -1.5 .4 1.4 -4.1 -3.7 -1.9 -3.5 -4.7 -9.3 -8.4 -3.8 -.3 .0 -1.5
-.9 -1.0 -1.5 -1.0 -1.0 -1.1 -1.3 -1.1 -.1 -.7 -.4 -.5 -.2 -.6 -1.7 -.9 -.5 -.8 -1.0 -3.0 -1.4 -2.2 -.8 -1.3 -2.0 -2.4 -3.1 -.8 -1.0 -2.5 .8 .2 -1.2 -.8 -.5 .6
-.4 -.5 0 -.2 .1 -.3 -.2 -.6 -.4 -.6 -1.4 -.2 -.3 -1.5 -1.7 -1.8 -1.9 -1.6 -2.1 -2.1 -2.4 -2.9 -1.6 -1.7 -2.3 -1.5 -2.0 -1.2 -1.2 1.7 2.1 2.0 1.8 1.0 -.1 -1.4
-6.7 -2.7 -1.7 -1.0 -1.1 -1.6 -.6 -.3 -.9 -.7 -1.2 -2.6 -2.9 -4.2

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 19
AUGUST 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT

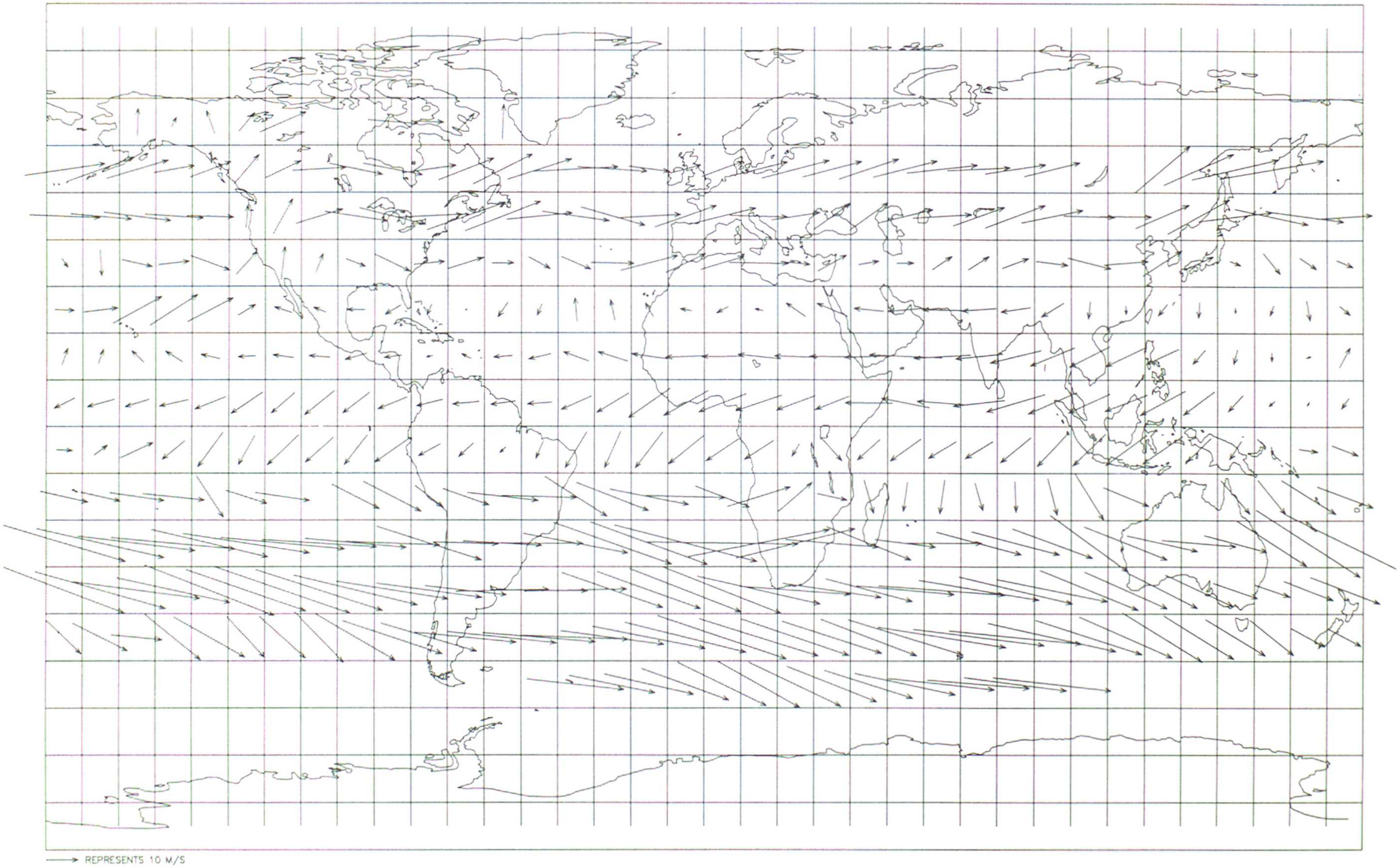

4 4 4 4 4 5
4 4 3 3 4 4 4 4 4 4 4 4 4 4 4 7 5 4 4 5 4 7 4 4 5 9 14 12
4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 3 4 4 6 4 4 6 8 9 11 12 13 8 5
5 3 4 4 4 4 4 4 4 4 4 4 5 4 3 3 4 4 4 3 4 5 10 7 7 9 6 9 5 7 7 7 4
5 4 5 4 4 4 4 4 4 4 4 4 4 3 3 4 4 4 4 3 4 6 8 10 10 9 7 8 8 7 8 7 7 5
6 4 4 4 5 6 5 4 4 4 5 4 3 3 4 4 5 4 5 4 4 4 4 8 10 10 14 11 13 10 6 7 6 9 4
5 4 4 5 5 6 6 5 5 5 4 4 4 4 4 6 5 6 6 4 4 5 8 13 15 13 17 17 13 10 7 17 8 7 7 6
6 5 5 6 5 7 5 5 6 6 5 4 5 5 6 6 4 6 5 6 10 9 9 8 9 11 13 11 9 6 6 7 8 9
5 5 5 5 4 7 5 4 4 5 6 5 6 5 7 7 9 10 7 7 5 6 8 10 11 9 10 8 18 12 9 8 5 5
6 5 5 5 5 5 5 5 6 6 7 6 5 5 5 6 6 16 24 9 9 6 5 11 12 12 11 12 10 17 16 13 11 5 6
5 4 5 5 5 4 5 5 4 5 5 6 5 6 6 6 6 7 8 10 8 7 6 7 8 11 11 6 7 7 9 8 9 6 5 5
4 4 4 4 4 4 4 4 5 4 5 5 5 5 6 6 7 6 8 9 8 9 8 8 8 7 8 6 7 8 7 7 7 8 7 6
10 8 6 6 6 6 6 5 8 7 7 7 8 8

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 101 AND 400 HPA FIGURE 20
AUGUST 1999



		1	4	7	4	1		0		6		1																							
13	42	42	39	47	52	86	86	58	49	53	57	55	47	24	9	13	[illegible]	12	[illegible]	11	11	15	17	12	12	11	5		0	3	4	4	3	0	0
147	145	101	79	72	99	219	218	192	122	88	[illegible]	167	173	135	44	20	28	30	20	21	19	14	13	8	14	17	16	17	24	39	50	54	50	41	54
194	104	66	64	40	45	175	325	249	173	240	291	215	132	63	44	10	12	20	8	3	3	6	4	3	25	39	34	43	46	50	56	35	35	48	179
178	78	40	17	12	13	172	477	310	316	304	202	142	68	24	21	7	9	7	5	3	9	11	11	22	60	77	100	92	61	46	49	41	43	63	168
321	240	210	186	178	280	538	1036	525	465	385	312	184	126	146	76	55	50	66	76	72	76	30	30	50	84	90	152	111	94	54	45	45	41	39	76
336	272	246	166	158	273	314	652	309	418	390	511	380	225	298	69	59	42	123	146	124	58	49	120	90	107	118	182	128	115	84	60	55	46	47	42
40	18	2	15	26	24	6	17	37	51	137	217	127	42	77	15	5	7	28	52	40	21	22	104	71	79	95	145	72	46	34	33	42	48	43	17
100	74	32	14	4	8	5	0	4	7	16	49	53	29	62	39	15	6	7	6	3	2	5	6	6	9	12	29	12	2	0	0	2	14	28	39
150	132	131	119	97	61	56	33	26	18	21	8	26	23	27	34	18	15	18	12	10	14	10	4	1	3	3	3	7	7	5	6	8	7	13	88
32	37	45	49	50	80	138	94	131	136	84	97	118	117	95	86	38	37	33	23	20	26	41	25	17	15	10	11	20	16	11	16	13	11	13	35
15	12	9	12	10	25	63	33	39	55	48	44	53	69	74	46	25	22	25	33	44	36	28	18	17	20	23	17	15	23	28	26	20	20	14	9
														2	4	5	8	9	8	7	8	7	9	7	5	4	3		0	0		0	0	0	

SATOB METEOSAT W/V VECTOR MEAN WINDS BETWEEN 101-400 HPA FIGURE 21
AUGUST 1999
ALL OBSERVATIONS
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT


⟶ REPRESENTS 10 M/S

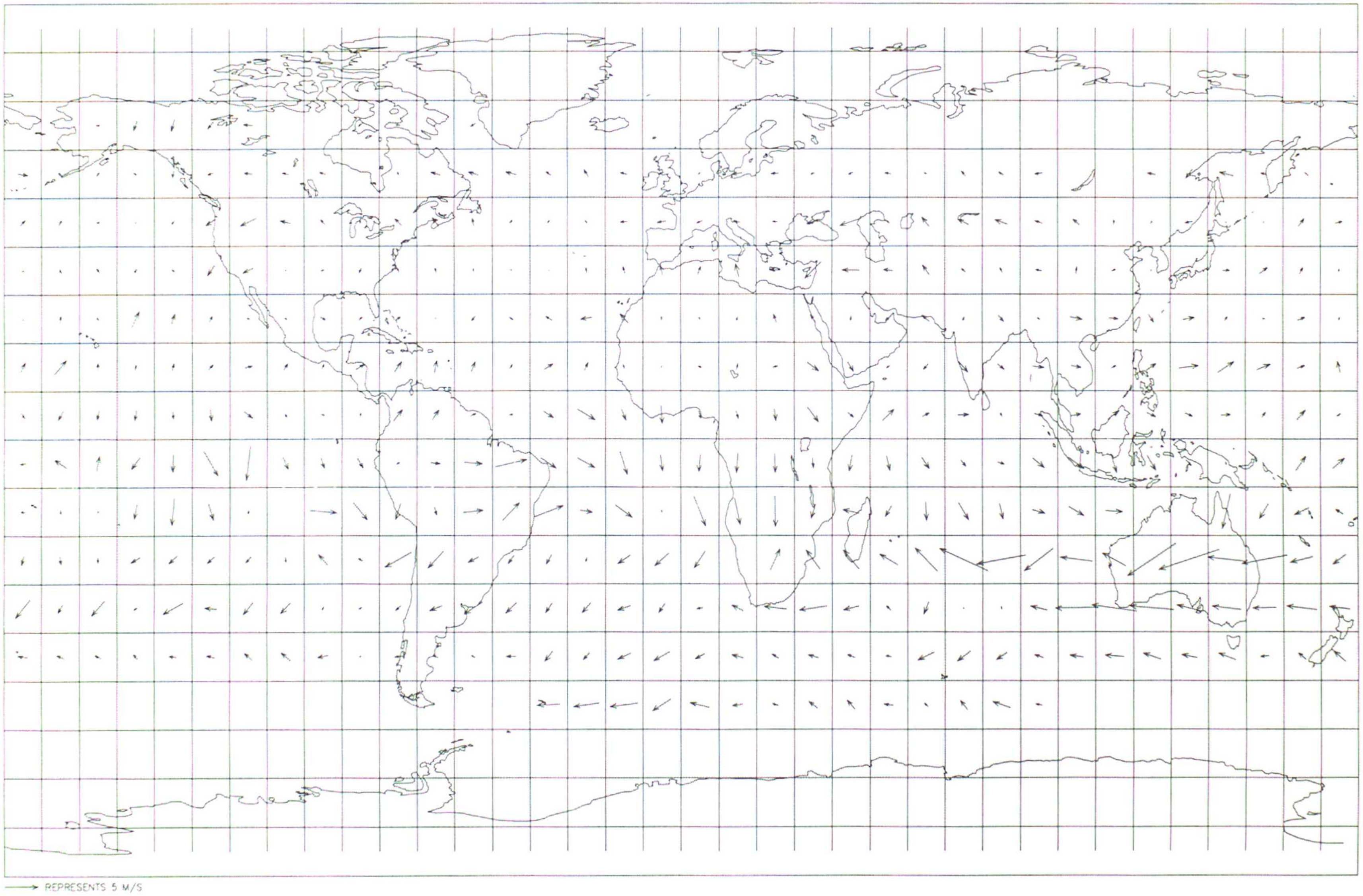
SATOB O–B VECTOR WIND DIFFERENCES BETWEEN 101–400 HPA

FIGURE 22

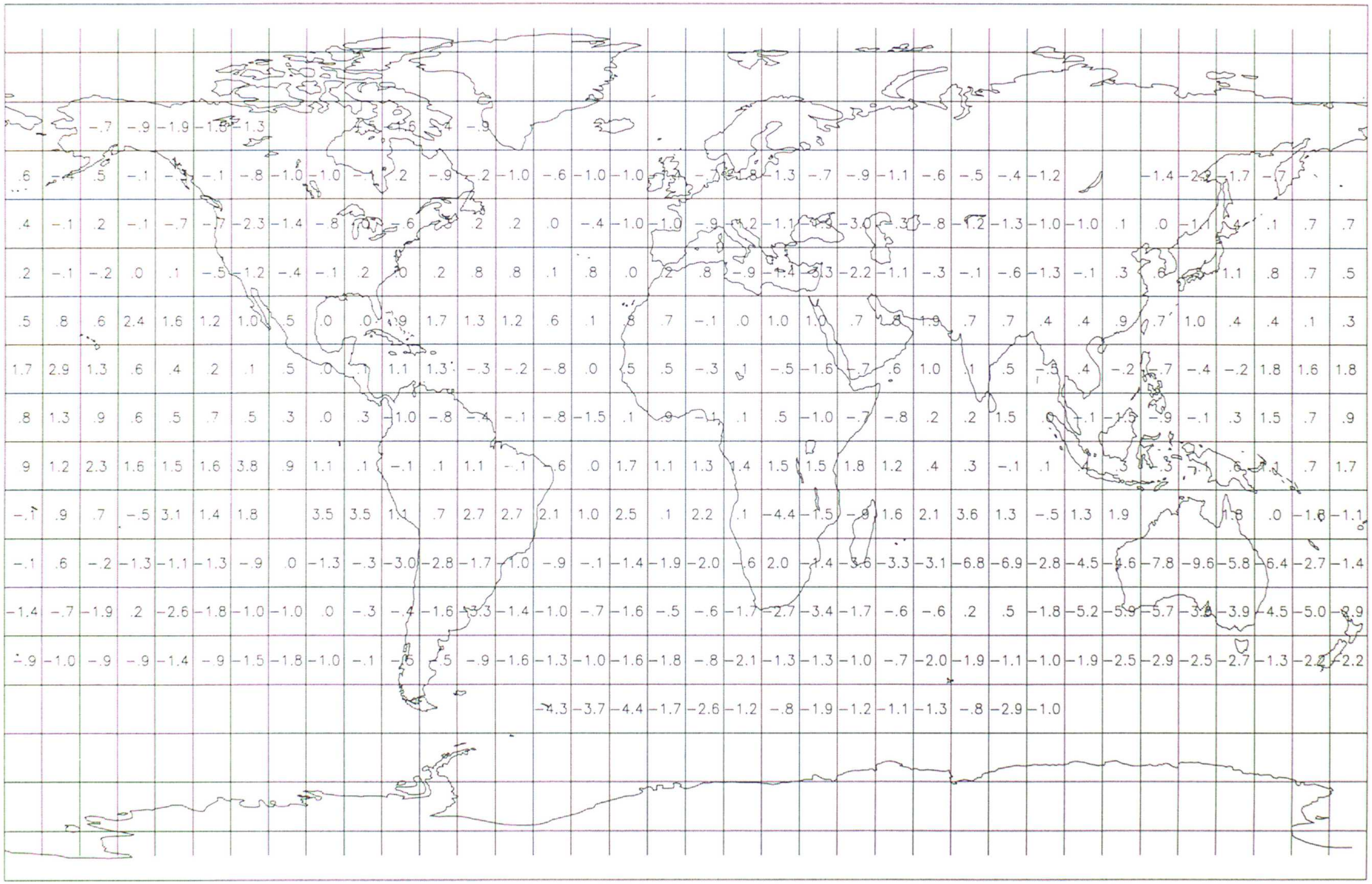
AUGUST 1999

ALL OBSERVATIONS

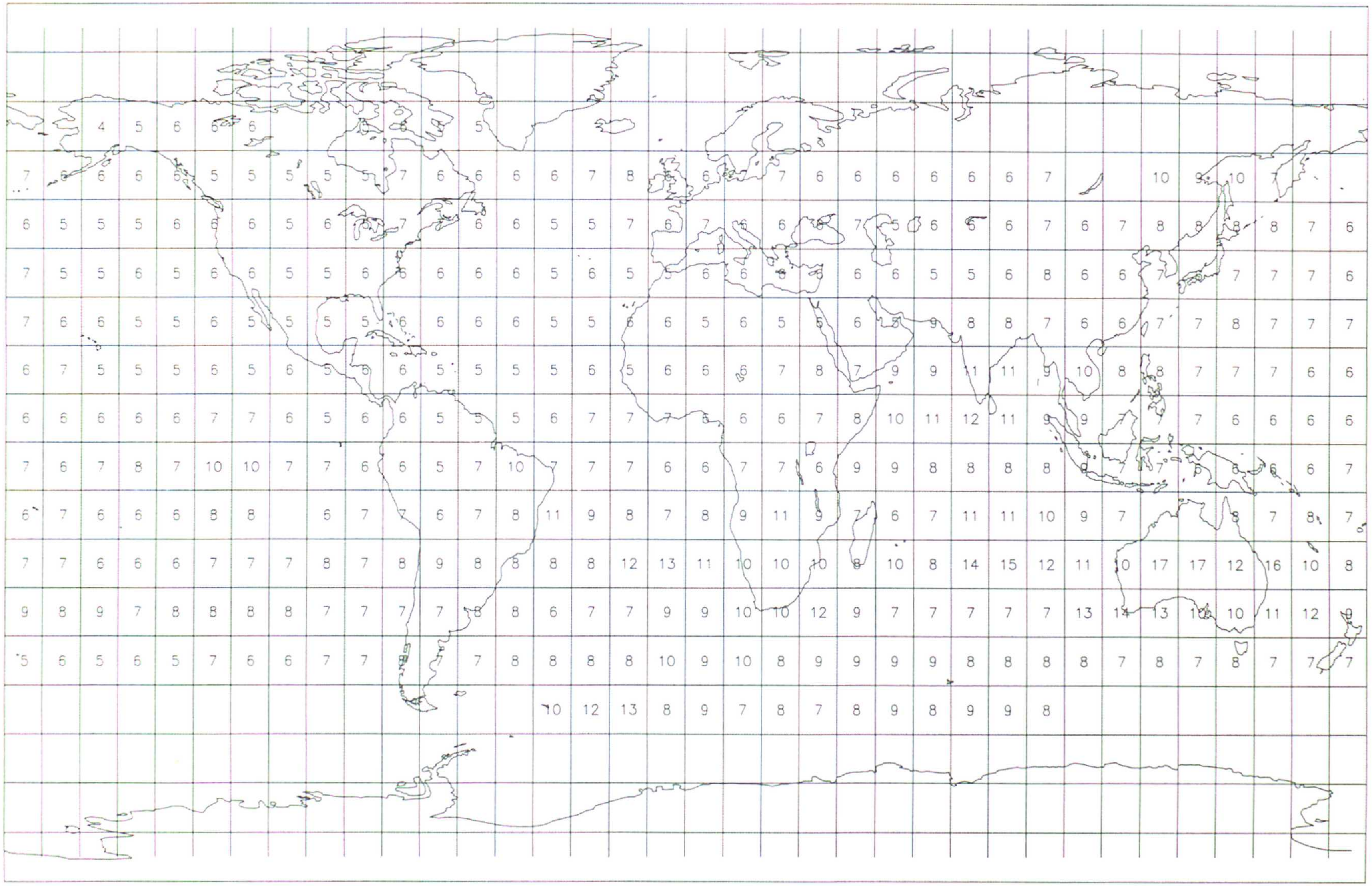
ARROWS PLOTTED WHERE MORE THAN 10 OBS ARE PRESENT



SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 23
AUGUST 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


-.7 -.9 -1.9 -1.8 -1.3 -.5 -.4 -.9
.6 -.4 .5 -.1 -.1 -.1 -.8 -1.0 -1.0 -.1 .2 -.9 -.2 -1.0 -.6 -1.0 -1.0 -1.1 -.7 -1.8 -1.3 -.7 -.9 -1.1 -.6 -.5 -.4 -1.2 -1.4 -2.2 -1.7 -.7
.4 -.1 .2 -.1 -.7 -.7 -2.3 -1.4 -.8 .0 -.6 .2 .2 .0 -.4 -1.0 -1.0 -.9 -1.2 -1.1 -1.9 -3.0 -.3 -.8 -1.2 -1.3 -1.0 -1.0 .1 .0 -1.1 .4 .1 .7 .7
.2 -.1 -.2 .0 .1 -.5 -1.2 -.4 -.1 .2 .0 .2 .8 .8 .1 .8 .0 .2 .8 -.9 -1.4 -3.3 -2.2 -1.1 -.3 -.1 -.6 -1.3 -.1 .3 .6 1.1 .8 .7 .5
.5 .8 .6 2.4 1.6 1.2 1.0 .5 .0 .0 .9 1.7 1.3 1.2 .6 .1 .8 .7 -.1 .0 1.0 1.0 .7 .8 1.9 .7 .7 .4 .4 .9 .7 1.0 .4 .4 .1 .3
1.7 2.9 1.3 .6 .4 .2 .1 .5 .0 .1 1.1 1.3 -.3 -.2 -.8 .0 .5 .5 -.3 .1 -.5 -1.6 -.7 .6 1.0 .1 .5 -.5 .4 -.2 -.7 -.4 -.2 1.8 1.6 1.8
.8 1.3 .9 .6 .5 .7 .5 .3 .0 .3 -1.0 -.8 -.4 -.1 -.8 -1.5 .1 .9 -.1 .1 .5 -1.0 -.7 -.8 .2 .2 1.5 .0 -.1 -1.5 -.9 -.1 .3 1.5 .7 .9
.9 1.2 2.3 1.6 1.5 1.6 3.8 .9 1.1 .1 -.1 .1 1.1 -.1 .6 .0 1.7 1.1 1.3 1.4 1.5 1.5 1.8 1.2 .4 .3 -.1 .1 .4 .3 .3 .6 1.1 .7 1.7
-.1 .9 .7 -.5 3.1 1.4 1.8 3.5 3.5 1.1 .7 2.7 2.7 2.1 1.0 2.5 .1 2.2 .1 -4.4 -1.5 -.9 1.6 2.1 3.6 1.3 -.5 1.3 1.9 1.8 .0 -1.6 -1.1
-.1 .6 -.2 -1.3 -1.1 -1.3 -.9 .0 -1.3 -.3 -3.0 -2.8 -1.7 -1.0 -.9 -.1 -1.4 -1.9 -2.0 -.6 2.0 -1.4 -3.6 -3.3 -3.1 -6.8 -6.9 -2.8 -4.5 -4.6 -7.8 -9.6 -5.8 -6.4 -2.7 -1.4
-1.4 -.7 -1.9 .2 -2.6 -1.8 -1.0 -1.0 .0 -.3 -.4 -1.6 -3.3 -1.4 -1.0 -.7 -1.6 -.5 -.6 -1.7 -2.7 -3.4 -1.7 -.6 -.6 .2 .5 -1.8 -5.2 -5.9 -5.7 -3.8 -3.9 -4.5 -5.0 -2.9
-.9 -1.0 -.9 -.9 -1.4 -.9 -1.5 -1.8 -1.0 -.1 -.6 -.5 -.9 -1.6 -1.3 -1.0 -1.6 -1.8 -.8 -2.1 -1.3 -1.3 -1.0 -.7 -2.0 -1.9 -1.1 -1.0 -1.9 -2.5 -2.9 -2.5 -2.7 -1.3 -2.2 -2.2
-4.3 -3.7 -4.4 -1.7 -2.6 -1.2 -.8 -1.9 -1.2 -1.1 -1.3 -.8 -2.9 -1.0

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 24
AUGUST 1999
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE MORE THAN 10 OBS ARE PRESENT


4 5 6 6 6 6 5
7 6 6 6 6 5 5 5 5 5 7 6 6 6 6 7 8 6 6 7 7 6 6 6 6 6 6 7 10 9 10 7
6 5 5 5 6 6 6 5 6 6 7 7 6 6 5 5 7 6 7 6 6 6 7 5 6 5 6 7 6 7 8 8 8 8 7 6
7 5 5 6 5 6 6 5 5 6 6 6 6 6 5 6 5 5 6 6 6 6 6 6 5 5 6 8 6 6 7 7 7 7 6
7 6 6 5 5 6 5 5 5 5 6 6 6 6 5 5 6 6 5 6 5 6 6 5 9 8 8 7 6 6 7 7 8 7 7 7
6 7 5 5 5 6 5 6 5 6 6 5 5 5 5 6 5 6 6 6 7 8 7 9 9 11 11 9 10 8 8 7 7 7 6 6
6 6 6 6 6 7 7 6 5 6 6 5 5 5 6 7 7 7 6 6 6 7 8 10 11 12 11 9 9 7 7 7 6 6 6 6
7 6 7 8 7 10 10 7 7 6 6 5 7 10 7 7 7 6 6 7 7 6 9 9 8 8 8 8 9 7 7 6 6 6 6 7
6 7 6 6 6 8 8 6 7 7 6 7 8 11 9 8 7 8 9 11 9 7 6 7 11 11 10 9 7 8 7 8 7
7 7 6 6 6 7 7 7 8 7 8 9 8 8 8 8 12 13 11 10 10 10 8 10 8 14 15 12 11 10 17 17 12 16 10 8
9 8 9 7 8 8 8 8 7 7 7 7 8 8 6 7 7 9 9 10 10 12 9 7 7 7 7 7 13 14 13 10 10 11 12 9
5 6 5 6 5 7 6 6 7 7 8 7 7 8 8 8 8 10 9 10 8 9 9 9 9 8 8 8 8 7 8 7 8 7 7 7
10 12 13 8 9 7 8 7 8 9 8 9 9 8

MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

MONTH: August 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from NOAA-15.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :All soundings.

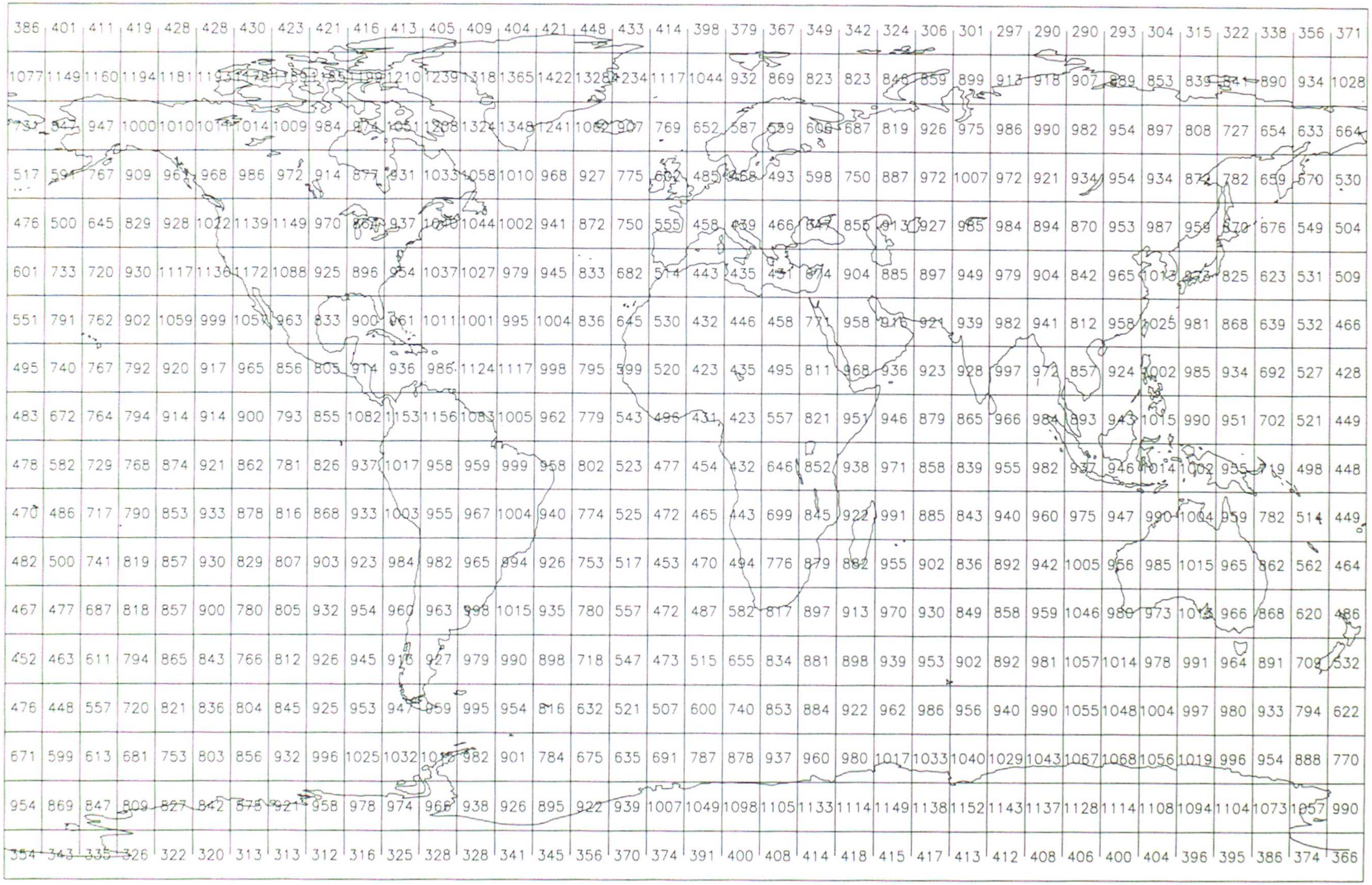
Data Extracted :Sounding channels (and approximate weighting function peaks, hPa)

- HIRS8 (Surface)
- HIRS15 (700)
- HIRS11 (500-700)
- HIRS4 (400)
- AMSUA5 (700)
- AMSUA7 (300)
- AMSUA9 (100)

:Mean and standard deviation observation-minus-background brightness temperature differences

ATOVS : MEAN DAILY NUMBER OF OBSERVATIONS
AUGUST 1999
NOAA-15, USING ALL OBSERVATIONS

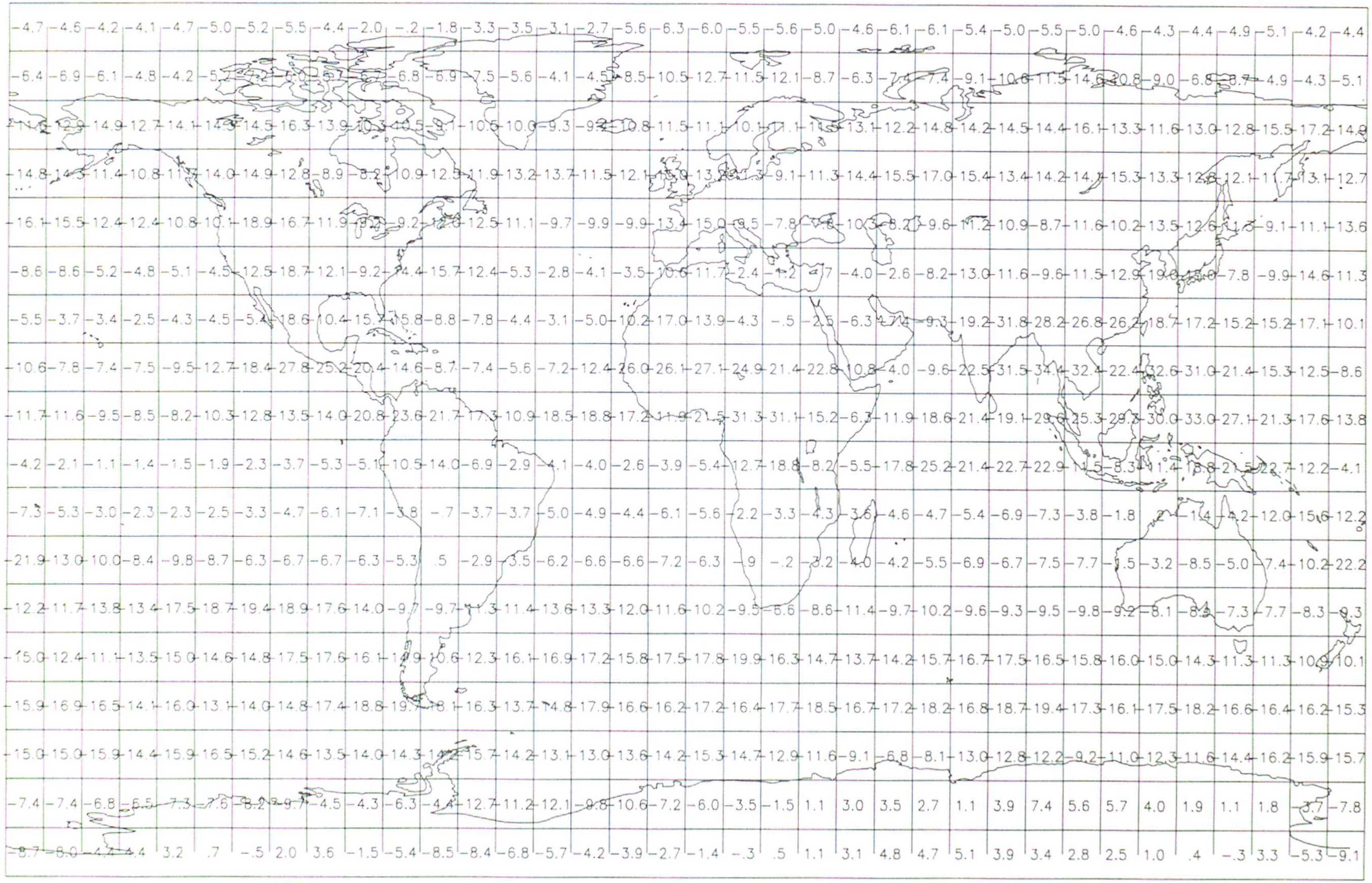
FIGURE 25



386	401	411	419	428	428	430	423	421	416	413	405	409	404	421	448	433	414	398	379	367	349	342	324	306	301	297	290	290	293	304	315	322	338	356	371
1077	1149	1160	1194	1181	1193	1178	1189	1185	1199	1210	1239	1318	1365	1422	1328	1234	1117	1044	932	869	823	823	846	859	899	913	918	907	889	853	839	841	890	934	1028
731	847	947	1000	1010	1011	1014	1009	984	974	1051	1208	1324	1348	1241	1062	907	769	652	587	539	606	687	819	926	975	986	990	982	954	897	808	727	654	633	664
517	591	767	909	961	968	986	972	914	877	931	1033	1058	1010	968	927	775	602	485	468	493	598	750	887	972	1007	972	921	934	954	934	872	782	659	570	530
476	500	645	829	928	1022	1139	1149	970	864	937	1040	1044	1002	941	872	750	555	458	439	466	647	855	913	927	985	984	894	870	953	987	959	870	676	549	504
601	733	720	930	1117	1136	1172	1088	925	896	954	1037	1027	979	945	833	682	514	443	435	451	674	904	885	897	949	979	904	842	965	1013	873	825	623	531	509
551	791	762	902	1059	999	1057	963	833	900	961	1011	1001	995	1004	836	645	530	432	446	458	771	958	916	921	939	982	941	812	958	1025	981	868	639	532	466
495	740	767	792	920	917	965	856	805	914	936	986	1124	1117	998	795	599	520	423	435	495	811	968	936	923	928	997	972	857	924	1002	985	934	692	527	428
483	672	764	794	914	914	900	793	855	1082	1153	1156	1083	1005	962	779	543	496	431	423	557	821	951	946	879	865	966	984	893	943	1015	990	951	702	521	449
478	582	729	768	874	921	862	781	826	937	1017	958	959	999	958	802	523	477	454	432	646	852	938	971	858	839	955	982	937	946	1014	1002	955	719	498	448
470	486	717	790	853	933	878	816	868	933	1003	955	967	1004	940	774	525	472	465	443	699	845	922	991	885	843	940	960	975	947	990	1004	959	782	514	449
482	500	741	819	857	930	829	807	903	923	984	982	965	894	926	753	517	453	470	494	776	879	882	955	902	836	892	942	1005	956	985	1015	965	862	562	464
467	477	687	818	857	900	780	805	932	954	960	963	998	1015	935	780	557	472	487	582	817	897	913	970	930	849	858	959	1046	980	973	1013	966	868	620	486
452	463	611	794	865	843	766	812	926	945	916	927	979	990	898	718	547	473	515	655	834	881	898	939	953	902	892	981	1057	1014	978	991	964	891	708	532
476	448	557	720	821	836	804	845	925	953	947	959	995	954	816	632	521	507	600	740	853	884	922	962	986	956	940	990	1055	1048	1004	997	980	933	794	622
671	599	613	681	753	803	856	932	996	1025	1032	1015	982	901	784	675	635	691	787	878	937	960	980	1017	1033	1040	1029	1043	1067	1068	1056	1019	996	954	888	770
954	869	847	809	827	842	875	921	958	978	974	966	938	926	895	922	939	1007	1049	1098	1105	1133	1114	1149	1138	1152	1143	1137	1128	1114	1108	1094	1104	1073	1057	990
354	343	335	326	322	320	313	313	312	316	325	328	328	341	345	356	370	374	391	400	408	414	418	415	417	413	412	408	406	400	404	396	395	386	374	366

ATOVS : MEAN O–B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)
AUGUST 1999 : HIRS8 channel (Surface)
NOAA–15, USING ALL OBSERVATIONS

FIGURE 26



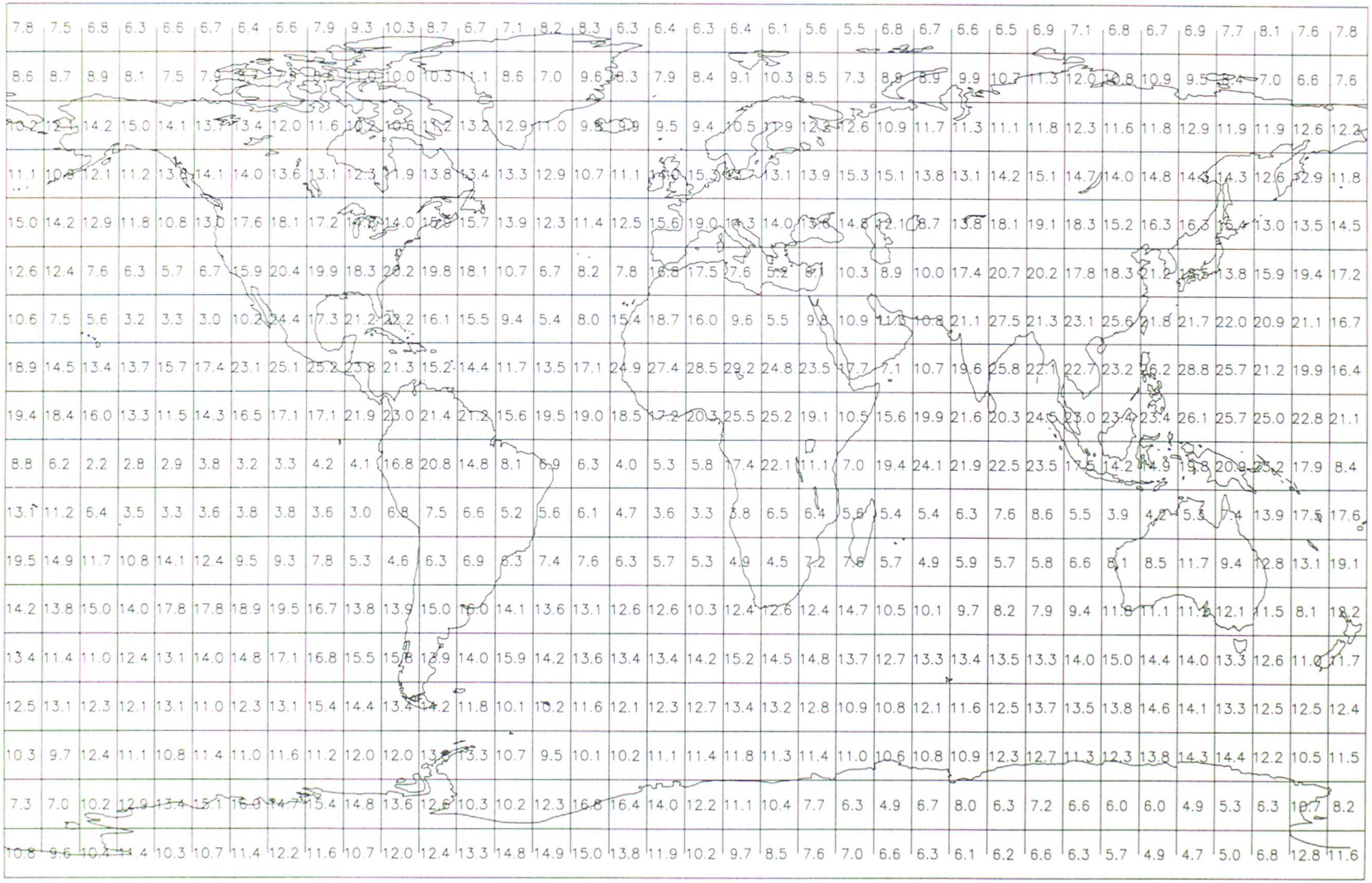
-4.7	-4.6	-4.2	-4.1	-4.7	-5.0	-5.2	-5.5	-4.4	-2.0	-.2	-1.8	-3.3	-3.5	-3.1	-2.7	-5.6	-6.3	-6.0	-5.5	-5.6	-5.0	-4.6	-6.1	-6.1	-5.4	-5.0	-5.5	-5.0	-4.6	-4.3	-4.4	-4.9	-5.1	-4.2	-4.4
-6.4	-6.9	-6.1	-4.8	-4.2	-5.2	-7.2	-6.0	-6.7	-6.7	-6.8	-6.9	-7.5	-5.6	-4.1	-4.5	-8.5	-10.5	-12.7	-11.5	-12.1	-8.7	-6.3	-7.4	-7.4	-9.1	-10.6	-11.5	-14.6	-20.8	-9.0	-6.8	-8.7	-4.9	-4.3	-5.1
-11.6	-12.9	-14.9	-12.7	-14.1	-14.3	-14.5	-16.3	-13.9	-10.3	-10.5	-9.1	-10.5	-10.0	-9.3	-9.2	-10.8	-11.5	-11.1	-10.1	-11.1	-11.5	-13.1	-12.2	-14.8	-14.2	-14.5	-14.4	-16.1	-13.3	-11.6	-13.0	-12.8	-15.5	-17.2	-14.9
-14.8	-14.3	-11.4	-10.8	-11.7	-14.0	-14.9	-12.8	-8.9	-8.2	-10.9	-12.5	-11.9	-13.2	-13.7	-11.5	-12.1	-15.0	-13.2	-11.3	-9.1	-11.3	-14.4	-15.5	-17.0	-15.4	-13.4	-14.2	-14.1	-15.3	-13.3	-12.8	-12.1	-11.7	-13.1	-12.7
-16.1	-15.5	-12.4	-12.4	-10.8	-10.1	-18.9	-16.7	-11.9	-8.2	-9.2	-12.6	-12.5	-11.1	-9.7	-9.9	-9.9	-13.4	-15.0	-9.5	-7.8	-7.8	-10.3	-8.2	-9.6	-11.2	-10.9	-8.7	-11.6	-10.2	-13.5	-12.6	-11.3	-9.1	-11.1	-13.6
-8.6	-8.6	-5.2	-4.8	-5.1	-4.5	-12.5	-18.7	-12.1	-9.2	-14.4	-15.7	-12.4	-5.3	-2.8	-4.1	-3.5	-10.6	-11.7	-2.4	-1.2	-.7	-4.0	-2.6	-8.2	-13.0	-11.6	-9.6	-11.5	-12.9	-19.0	-15.0	-7.8	-9.9	-14.6	-11.3
-5.5	-3.7	-3.4	-2.5	-4.3	-4.5	-5.4	-18.6	-10.4	-15.7	-15.8	-8.8	-7.8	-4.4	-3.1	-5.0	-10.2	-17.0	-13.9	-4.3	-.5	-2.5	-6.3	-7.4	-9.3	-19.2	-31.8	-28.2	-26.8	-26.2	-18.7	-17.2	-15.2	-15.2	-17.1	-10.1
-10.6	-7.8	-7.4	-7.5	-9.5	-12.7	-18.4	-27.8	-25.2	-20.4	-14.6	-8.7	-7.4	-5.6	-7.2	-12.4	-26.0	-26.1	-27.1	-24.9	-21.4	-22.8	-10.8	-4.0	-9.6	-22.5	-31.5	-34.4	-32.4	-22.4	-32.6	-31.0	-21.4	-15.3	-12.5	-8.6
-11.7	-11.6	-9.5	-8.5	-8.2	-10.3	-12.8	-13.5	-14.0	-20.8	-23.6	-21.7	-17.3	-10.9	-18.5	-18.8	-17.2	-11.9	-21.5	-31.3	-31.1	-15.2	-6.3	-11.9	-18.6	-21.4	-19.1	-29.6	-25.3	-29.3	-30.0	-33.0	-27.1	-21.3	-17.6	-13.8
-4.2	-2.1	-1.1	-1.4	-1.5	-1.9	-2.3	-3.7	-5.3	-5.1	-10.5	-14.0	-6.9	-2.9	-4.1	-4.0	-2.6	-3.9	-5.4	-12.7	-18.8	-8.2	-5.5	-17.8	-25.2	-21.4	-22.7	-22.9	-11.5	-8.3	-11.4	-18.8	-21.5	-22.7	-12.2	-4.1
-7.3	-5.3	-3.0	-2.3	-2.3	-2.5	-3.3	-4.7	-6.1	-7.1	-3.8	-.7	-3.7	-3.7	-5.0	-4.9	-4.4	-6.1	-5.6	-2.2	-3.3	-4.3	-3.6	-4.6	-4.7	-5.4	-6.9	-7.3	-3.8	-1.8	.2	-1.4	-4.2	-12.0	-15.6	-12.2
-21.9	-13.0	-10.0	-8.4	-9.8	-8.7	-6.3	-6.7	-6.7	-6.3	-5.3	.5	-2.9	-3.5	-6.2	-6.6	-6.6	-7.2	-6.3	-.9	-.2	-3.2	-4.0	-4.2	-5.5	-6.9	-6.7	-7.5	-7.7	-1.5	-3.2	-8.5	-5.0	-7.4	-10.2	-22.2
-12.2	-11.7	-13.8	-13.4	-17.5	-18.7	-19.4	-18.9	-17.6	-14.0	-9.7	-9.7	-11.3	-11.4	-13.6	-13.3	-12.0	-11.6	-10.2	-9.5	-5.6	-8.6	-11.4	-9.7	-10.2	-9.6	-9.3	-9.5	-9.8	-9.2	-8.1	-8.3	-7.3	-7.7	-8.3	-9.3
-15.0	-12.4	-11.1	-13.5	-15.0	-14.6	-14.8	-17.5	-17.6	-16.1	-14.9	-10.6	-12.3	-16.1	-16.9	-17.2	-15.8	-17.5	-17.8	-19.9	-16.3	-14.7	-13.7	-14.2	-15.7	-16.7	-17.5	-16.5	-15.8	-16.0	-15.0	-14.3	-11.3	-11.3	-10.9	-10.1
-15.9	-16.9	-16.5	-14.1	-16.0	-13.1	-14.0	-14.8	-17.4	-18.8	-19.7	-18.1	-16.3	-13.7	-14.8	-17.9	-16.6	-16.2	-17.2	-16.4	-17.7	-18.5	-16.7	-17.2	-18.2	-16.8	-18.7	-19.4	-17.3	-16.1	-17.5	-18.2	-16.6	-16.4	-16.2	-15.3
-15.0	-15.0	-15.9	-14.4	-15.9	-16.5	-15.2	-14.6	-13.5	-14.0	-14.3	-14.2	-15.7	-14.2	-13.1	-13.0	-13.6	-14.2	-15.3	-14.7	-12.9	-11.6	-9.1	-6.8	-8.1	-13.0	-12.8	-12.2	-9.2	-11.0	-12.3	-11.6	-14.4	-16.2	-15.9	-15.7
-7.4	-7.4	-6.8	-6.5	-7.3	-7.6	-8.2	-9.7	-4.5	-4.3	-6.3	-4.4	-12.7	-11.2	-12.1	-9.8	-10.6	-7.2	-6.0	-3.5	-1.5	1.1	3.0	3.5	2.7	1.1	3.9	7.4	5.6	5.7	4.0	1.9	1.1	1.8	-3.7	-7.8
-8.7	-8.0	-4.4	4.4	3.2	.7	-.5	2.0	3.6	-1.5	-5.4	-8.5	-8.4	-6.8	-5.7	-4.2	-3.9	-2.7	-1.4	-.3	.5	1.1	3.1	4.8	4.7	5.1	3.9	3.4	2.8	2.5	1.0	.4	-.3	3.3	-5.3	-9.1

ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)

AUGUST 1999 : HIRS8 channel (Surface)

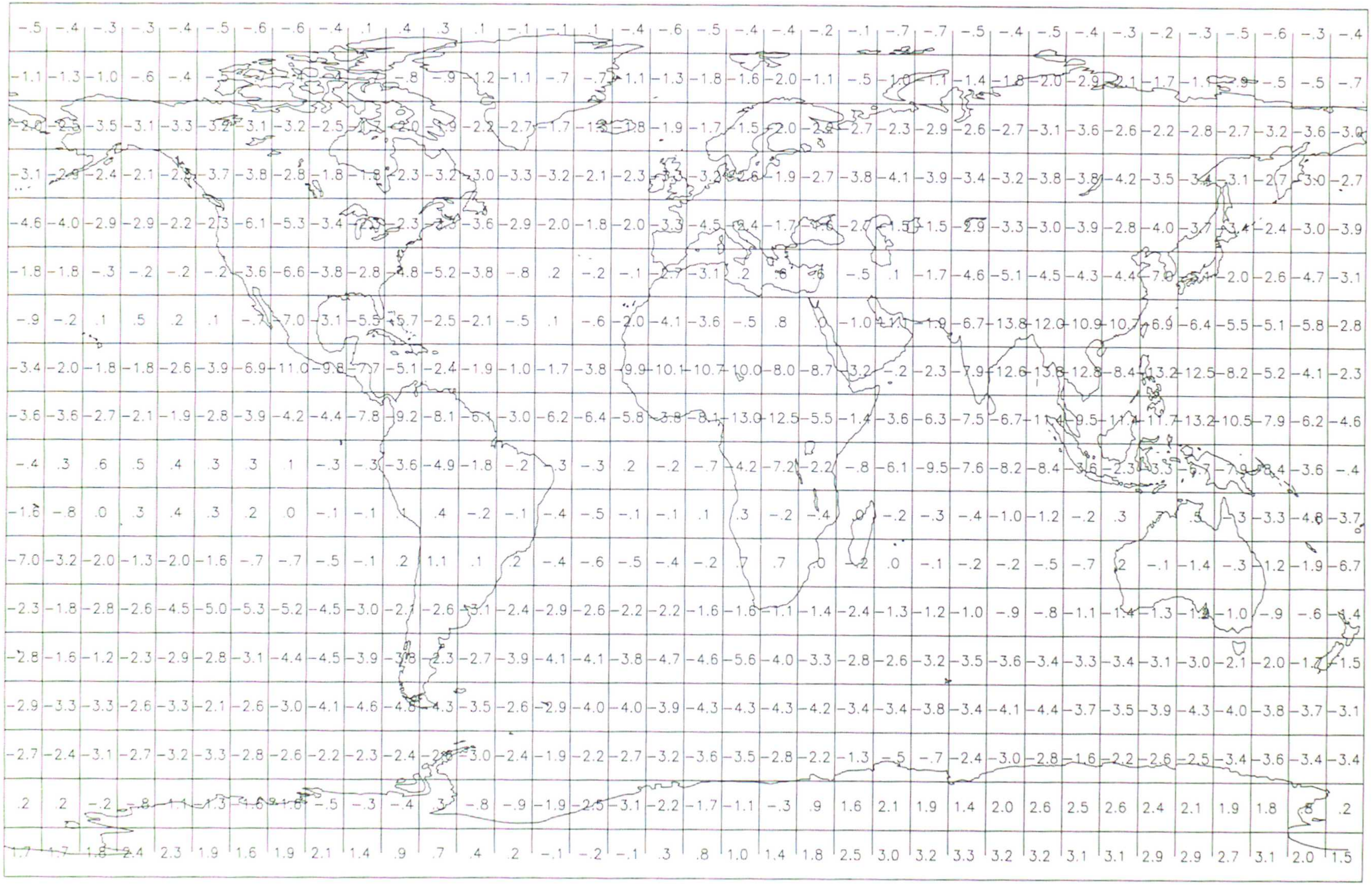
NOAA-15, USING ALL OBSERVATIONS

FIGURE 27



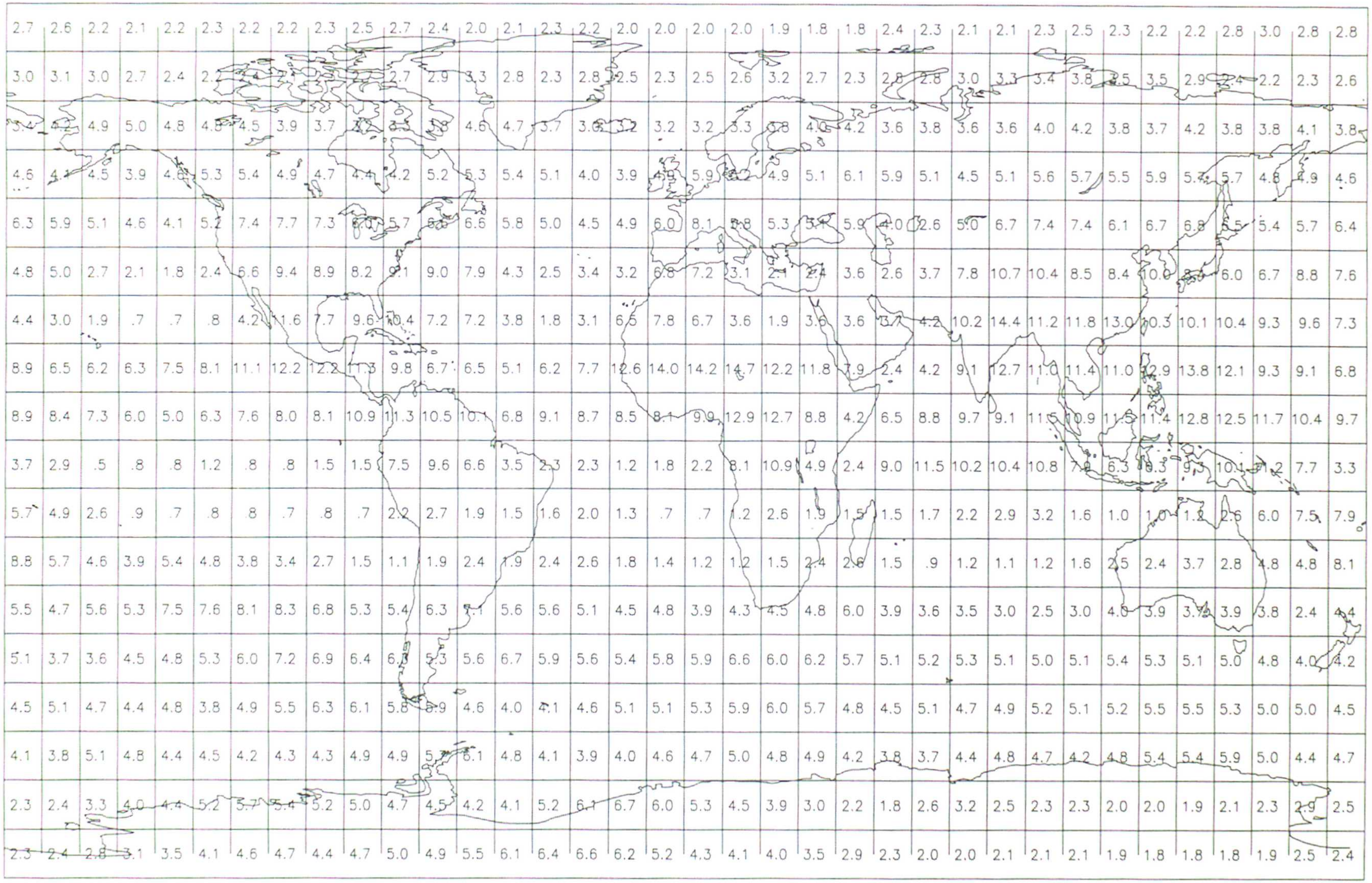
7.8	7.5	6.8	6.3	6.6	6.7	6.4	6.6	7.9	9.3	10.3	8.7	6.7	7.1	8.2	8.3	6.3	6.4	6.3	6.4	6.1	5.6	5.5	6.8	6.7	6.6	6.5	6.9	7.1	6.8	6.7	6.9	7.7	8.1	7.6	7.8
8.6	8.7	8.9	8.1	7.5	7.9	8.7	7.9	8.5	11.0	10.0	10.3	11.1	8.6	7.0	9.6	8.3	7.9	8.4	9.1	10.3	8.5	7.3	8.9	8.9	9.9	10.7	11.3	12.0	10.8	10.9	9.5	8.4	7.0	6.6	7.6
10.2	12.1	14.2	15.0	14.1	13.7	13.4	12.0	11.6	10.2	10.6	11.2	13.2	12.9	11.0	9.5	9.9	9.5	9.4	10.5	11.9	12.2	12.6	10.9	11.7	11.3	11.1	11.8	12.3	11.6	11.8	12.9	11.9	11.9	12.6	12.2
11.1	10.9	12.1	11.2	13.6	14.1	14.0	13.6	13.1	12.3	11.9	13.8	13.4	13.3	12.9	10.7	11.1	14.0	15.3	13.7	13.1	13.9	15.3	15.1	13.8	13.1	14.2	15.1	14.7	14.0	14.8	14.3	14.3	12.6	12.9	11.8
15.0	14.2	12.9	11.8	10.8	13.0	17.6	18.1	17.2	14.8	14.0	15.9	15.7	13.9	12.3	11.4	12.5	15.6	19.0	14.3	14.0	13.6	14.8	12.1	18.7	13.8	18.1	19.1	18.3	15.2	16.3	16.3	15.4	13.0	13.5	14.5
12.6	12.4	7.6	6.3	5.7	6.7	15.9	20.4	19.9	18.3	20.2	19.8	18.1	10.7	6.7	8.2	7.8	16.8	17.5	17.6	5.2	8.1	10.3	8.9	10.0	17.4	20.7	20.2	17.8	18.3	21.2	18.5	13.8	15.9	19.4	17.2
10.6	7.5	5.6	3.2	3.3	3.0	10.2	24.4	17.3	21.2	22.2	16.1	15.5	9.4	5.4	8.0	15.4	18.7	16.0	9.6	5.5	9.8	10.9	11.5	10.8	21.1	27.5	21.3	23.1	25.6	21.8	21.7	22.0	20.9	21.1	16.7
18.9	14.5	13.4	13.7	15.7	17.4	23.1	25.1	25.2	23.8	21.3	15.2	14.4	11.7	13.5	17.1	24.9	27.4	28.5	29.2	24.8	23.5	17.7	7.1	10.7	19.6	25.8	22.1	22.7	23.2	26.2	28.8	25.7	21.2	19.9	16.4
19.4	18.4	16.0	13.3	11.5	14.3	16.5	17.1	17.1	21.9	23.0	21.4	21.2	15.6	19.5	19.0	18.5	17.2	20.3	25.5	25.2	19.1	10.5	15.6	19.9	21.6	20.3	24.5	23.0	23.4	23.4	26.1	25.7	25.0	22.8	21.1
8.8	6.2	2.2	2.8	2.9	3.8	3.2	3.3	4.2	4.1	16.8	20.8	14.8	8.1	6.9	6.3	4.0	5.3	5.8	17.4	22.1	11.1	7.0	19.4	24.1	21.9	22.5	23.5	17.5	14.2	14.9	19.8	20.9	25.2	17.9	8.4
13.1	11.2	6.4	3.5	3.3	3.6	3.8	3.8	3.6	3.0	6.8	7.5	6.6	5.2	5.6	6.1	4.7	3.6	3.3	3.8	6.5	6.4	5.6	5.4	5.4	6.3	7.6	8.6	5.5	3.9	4.2	5.3	7.4	13.9	17.5	17.6
19.5	14.9	11.7	10.8	14.1	12.4	9.5	9.3	7.8	5.3	4.6	6.3	6.9	6.3	7.4	7.6	6.3	5.7	5.3	4.9	4.5	7.2	7.6	5.7	4.9	5.9	5.7	5.8	6.6	8.1	8.5	11.7	9.4	12.8	13.1	19.1
14.2	13.8	15.0	14.0	17.8	17.8	18.9	19.5	16.7	13.8	13.9	15.0	16.0	14.1	13.6	13.1	12.6	12.6	10.3	12.4	12.6	12.4	14.7	10.5	10.1	9.7	8.2	7.9	9.4	11.8	11.1	11.5	12.1	11.5	8.1	18.2
13.4	11.4	11.0	12.4	13.1	14.0	14.8	17.1	16.8	15.5	15.8	13.9	14.0	15.9	14.2	13.6	13.4	13.4	14.2	15.2	14.5	14.8	13.7	12.7	13.3	13.4	13.5	13.3	14.0	15.0	14.4	14.0	13.3	12.6	11.0	11.7
12.5	13.1	12.3	12.1	13.1	11.0	12.3	13.1	15.4	14.4	13.4	14.2	11.8	10.1	10.2	11.6	12.1	12.3	12.7	13.4	13.2	12.8	10.9	10.8	12.1	11.6	12.5	13.7	13.5	13.8	14.6	14.1	13.3	12.5	12.5	12.4
10.3	9.7	12.4	11.1	10.8	11.4	11.0	11.6	11.2	12.0	12.0	13.3	13.3	10.7	9.5	10.1	10.2	11.1	11.4	11.8	11.3	11.4	11.0	10.6	10.8	10.9	12.3	12.7	11.3	12.3	13.8	14.3	14.4	12.2	10.5	11.5
7.3	7.0	10.2	12.9	13.4	15.1	16.0	14.7	15.4	14.8	13.6	12.6	10.3	10.2	12.3	16.8	16.4	14.0	12.2	11.1	10.4	7.7	6.3	4.9	6.7	8.0	6.3	7.2	6.6	6.0	6.0	4.9	5.3	6.3	10.7	8.2
10.8	9.6	10.4	11.4	10.3	10.7	11.4	12.2	11.6	10.7	12.0	12.4	13.3	14.8	14.9	15.0	13.8	11.9	10.2	9.7	8.5	7.6	7.0	6.6	6.3	6.1	6.2	6.6	6.3	5.7	4.9	4.7	5.0	6.8	12.8	11.6

ATOVS : MEAN O–B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C) FIGURE 28
AUGUST 1999 : HIRS15 Channel (700 hPa)
NOAA–15, USING ALL OBSERVATIONS


–.5 –.4 –.3 –.3 –.4 –.5 –.6 –.6 –.4 .1 .4 .3 .1 –.1 –.1 .1 –.4 –.6 –.5 –.4 –.4 –.2 –.1 –.7 –.7 –.5 –.4 –.5 –.4 –.3 –.2 –.3 –.5 –.6 –.3 –.4
–1.1 –1.3 –1.0 –.6 –.4 –.5 –.7 –.4 –.4 –.7 –.8 –.9 –1.2 –1.1 –.7 –.7 –1.1 –1.3 –1.8 –1.6 –2.0 –1.1 –.5 –1.0 –1.1 –1.4 –1.8 –2.0 –2.9 –2.1 –1.7 –1.1 –.9 –.5 –.5 –.7
–2.0 –2.5 –3.5 –3.1 –3.3 –3.2 –3.1 –3.2 –2.5 –1.7 –2.0 –1.9 –2.2 –2.7 –1.7 –1.3 –1.8 –1.9 –1.7 –1.5 –2.0 –2.2 –2.7 –2.3 –2.9 –2.6 –2.7 –3.1 –3.6 –2.6 –2.2 –2.8 –2.7 –3.2 –3.6 –3.0
–3.1 –2.9 –2.4 –2.1 –2.9 –3.7 –3.8 –2.8 –1.8 –1.8 –2.3 –3.2 –3.0 –3.3 –3.2 –2.1 –2.3 –3.1 –3.2 –2.6 –1.9 –2.7 –3.8 –4.1 –3.9 –3.4 –3.2 –3.8 –3.8 –4.2 –3.5 –3.4 –3.1 –2.7 –3.0 –2.7
–4.6 –4.0 –2.9 –2.9 –2.2 –2.3 –6.1 –5.3 –3.4 –2.2 –2.3 –2.3 –3.6 –2.9 –2.0 –1.8 –2.0 –3.3 –4.5 –3.4 –1.7 –1.6 –2.7 –1.5 –1.5 –2.9 –3.3 –3.0 –3.9 –2.8 –4.0 –3.7 –3.4 –2.4 –3.0 –3.9
–1.8 –1.8 –.3 –.2 –.2 –.2 –3.6 –6.6 –3.8 –2.8 –4.8 –5.2 –3.8 –.8 .2 –.2 –.1 –2.7 –3.1 .2 .6 .6 –.5 .1 –1.7 –4.6 –5.1 –4.5 –4.3 –4.4 –7.0 –5.1 –2.0 –2.6 –4.7 –3.1
–.9 –.2 .1 .5 .2 .1 –.7 –7.0 –3.1 –5.5 –5.7 –2.5 –2.1 –.5 .1 –.6 –2.0 –4.1 –3.6 –.5 .8 .0 –1.0 –1.1 –1.9 –6.7 –13.8 –12.0 –10.9 –10.7 –6.9 –6.4 –5.5 –5.1 –5.8 –2.8
–3.4 –2.0 –1.8 –1.8 –2.6 –3.9 –6.9 –11.0 –9.8 –7.7 –5.1 –2.4 –1.9 –1.0 –1.7 –3.8 –9.9 –10.1 –10.7 –10.0 –8.0 –8.7 –3.2 –.2 –2.3 –7.9 –12.6 –13.8 –12.8 –8.4 –13.2 –12.5 –8.2 –5.2 –4.1 –2.3
–3.6 –3.6 –2.7 –2.1 –1.9 –2.8 –3.9 –4.2 –4.4 –7.8 –9.2 –8.1 –6.1 –3.0 –6.2 –6.4 –5.8 –3.8 –8.1 –13.0 –12.5 –5.5 –1.4 –3.6 –6.3 –7.5 –6.7 –11.4 –9.5 –11.1 –11.7 –13.2 –10.5 –7.9 –6.2 –4.6
–.4 .3 .6 .5 .4 .3 .3 .1 –.3 –.3 –3.6 –4.9 –1.8 –.2 –.3 –.3 .2 –.2 –.7 –4.2 –7.2 –2.2 –.8 –6.1 –9.5 –7.6 –8.2 –8.4 –3.6 –2.3 –3.3 –5.7 –7.9 –8.4 –3.6 –.4
–1.6 –.8 .0 .3 .4 .3 .2 .0 –.1 –.1 .1 .4 –.2 –.1 –.4 –.5 –.1 –.1 .1 .3 –.2 –.4 .0 –.2 –.3 –.4 –1.0 –1.2 –.2 .3 .7 .5 –.3 –3.3 –4.6 –3.7
–7.0 –3.2 –2.0 –1.3 –2.0 –1.6 –.7 –.7 –.5 –.1 .2 1.1 .1 .2 –.4 –.6 –.5 –.4 –.2 .7 .7 .0 –.2 .0 –.1 –.2 –.2 –.5 –.7 .2 –.1 –1.4 –.3 –1.2 –1.9 –6.7
–2.3 –1.8 –2.8 –2.6 –4.5 –5.0 –5.3 –5.2 –4.5 –3.0 –2.1 –2.6 –3.1 –2.4 –2.9 –2.6 –2.2 –2.2 –1.6 –1.6 –1.1 –1.4 –2.4 –1.3 –1.2 –1.0 –.9 –.8 –1.1 –1.4 –1.3 –1.2 –1.0 –.9 –.6 –1.4
–2.8 –1.6 –1.2 –2.3 –2.9 –2.8 –3.1 –4.4 –4.5 –3.9 –3.8 –2.3 –2.7 –3.9 –4.1 –4.1 –3.8 –4.7 –4.6 –5.6 –4.0 –3.3 –2.8 –2.6 –3.2 –3.5 –3.6 –3.4 –3.3 –3.4 –3.1 –3.0 –2.1 –2.0 –1.7 –1.5
–2.9 –3.3 –3.3 –2.6 –3.3 –2.1 –2.6 –3.0 –4.1 –4.6 –4.8 –4.3 –3.5 –2.6 –2.9 –4.0 –4.0 –3.9 –4.3 –4.3 –4.3 –4.2 –3.4 –3.4 –3.8 –3.4 –4.1 –4.4 –3.7 –3.5 –3.9 –4.3 –4.0 –3.8 –3.7 –3.1
–2.7 –2.4 –3.1 –2.7 –3.2 –3.3 –2.8 –2.6 –2.2 –2.3 –2.4 –2.8 –3.0 –2.4 –1.9 –2.2 –2.7 –3.2 –3.6 –3.5 –2.8 –2.2 –1.3 –.5 –.7 –2.4 –3.0 –2.8 –1.6 –2.2 –2.6 –2.5 –3.4 –3.6 –3.4 –3.4
.2 .2 –.2 –.8 –1.1 –1.3 –1.6 –1.6 –.5 –.3 –.4 .3 –.8 –.9 –1.9 –2.5 –3.1 –2.2 –1.7 –1.1 –.3 .9 1.6 2.1 1.9 1.4 2.0 2.6 2.5 2.6 2.4 2.1 1.9 1.8 .8 .2
1.7 1.7 1.8 2.4 2.3 1.9 1.6 1.9 2.1 1.4 .9 .7 .4 .2 –.1 –.2 –.1 .3 .8 1.0 1.4 1.8 2.5 3.0 3.2 3.3 3.2 3.2 3.1 3.1 2.9 2.9 2.7 3.1 2.0 1.5

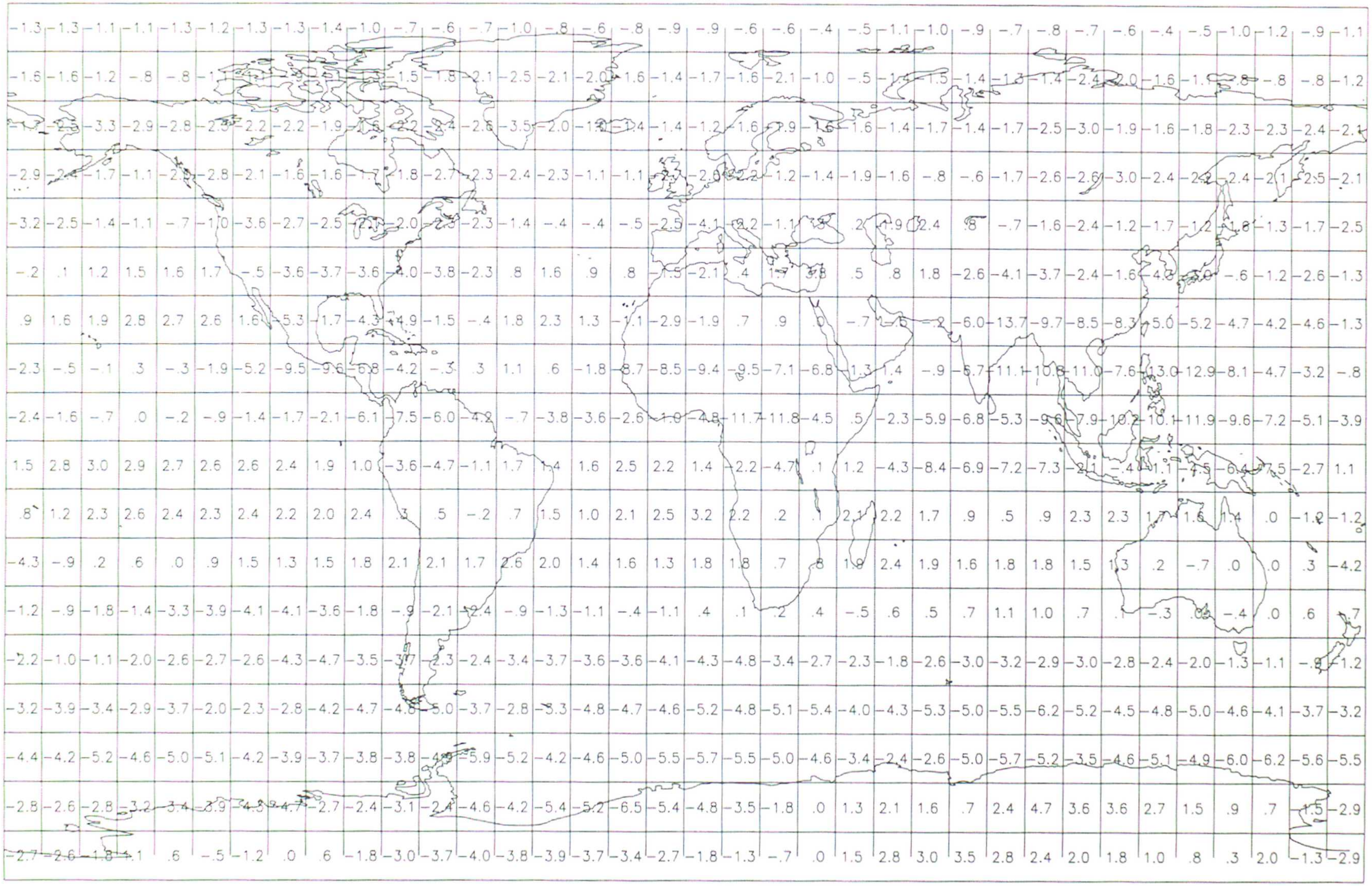
ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
AUGUST 1999 : HIRS15 channel (700 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 29



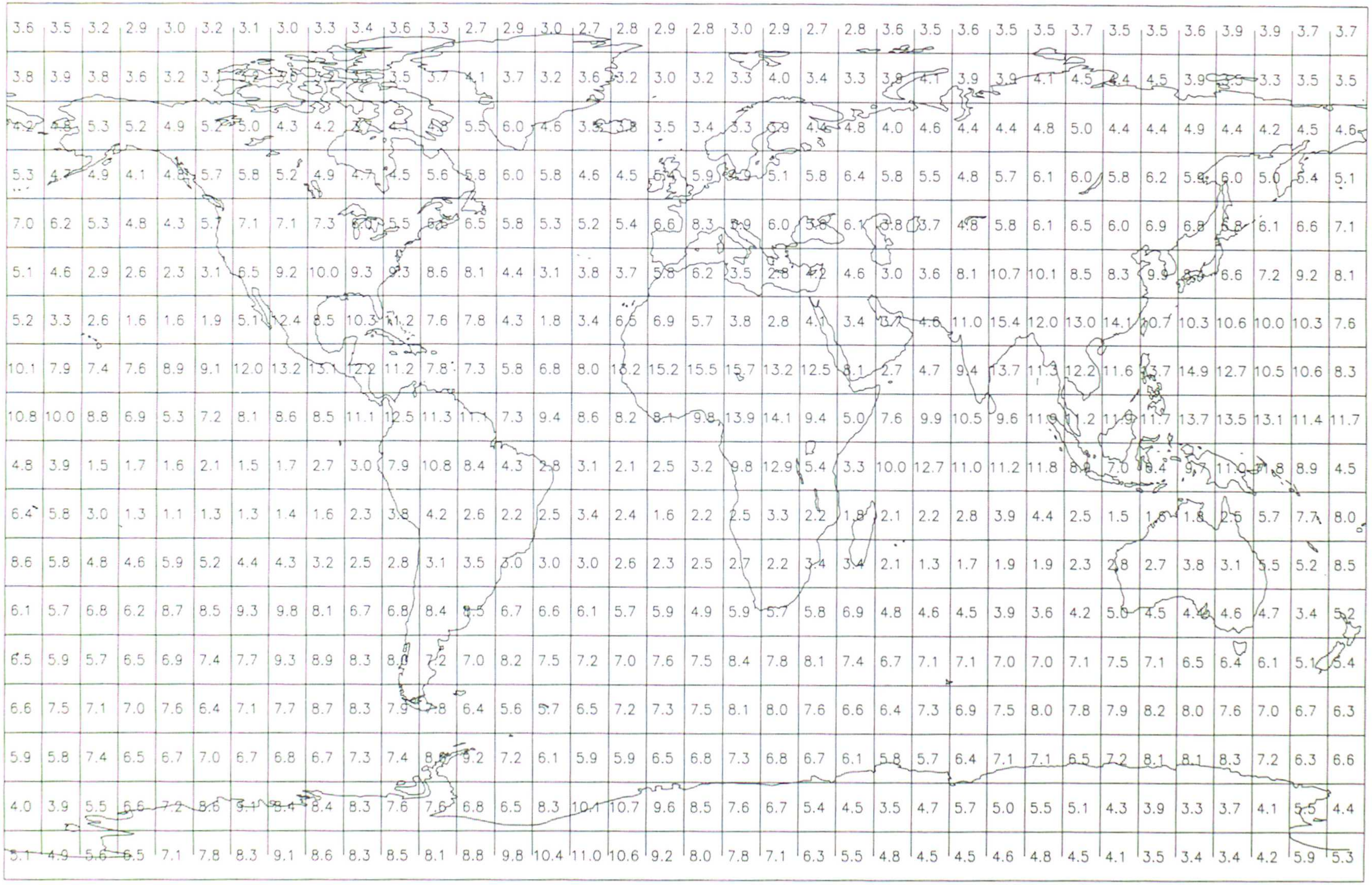
2.7	2.6	2.2	2.1	2.2	2.3	2.2	2.2	2.3	2.5	2.7	2.4	2.0	2.1	2.3	2.2	2.0	2.0	2.0	2.0	1.9	1.8	1.8	2.4	2.3	2.1	2.1	2.3	2.5	2.3	2.2	2.2	2.8	3.0	2.8	2.8
3.0	3.1	3.0	2.7	2.4	2.2	[illegible]	[illegible]	[illegible]	[illegible]	2.7	2.9	3.3	2.8	2.3	2.8	2.5	2.3	2.5	2.6	3.2	2.7	2.3	2.8	2.8	3.0	3.3	3.4	3.8	3.5	3.5	2.9	2.4	2.2	2.3	2.6
3.4	4.2	4.9	5.0	4.8	4.8	4.5	3.9	3.7	3.2	3.3	3.8	4.6	4.7	3.7	3.6	3.2	3.2	3.2	3.3	3.8	4.0	4.2	3.6	3.8	3.6	3.6	4.0	4.2	3.8	3.7	4.2	3.8	3.8	4.1	3.8
4.6	4.1	4.5	3.9	4.6	5.3	5.4	4.9	4.7	4.4	4.2	5.2	5.3	5.4	5.1	4.0	3.9	4.9	5.9	[illegible]	4.9	5.1	6.1	5.9	5.1	4.5	5.1	5.6	5.7	5.5	5.9	5.7	5.7	4.8	4.9	4.6
6.3	5.9	5.1	4.6	4.1	5.2	7.4	7.7	7.3	6.0	5.7	6.6	6.5	5.8	5.0	4.5	4.9	6.0	8.1	5.8	5.3	5.4	5.9	4.0	2.6	5.0	6.7	7.4	7.4	6.1	6.7	6.8	6.5	5.4	5.7	6.4
4.8	5.0	2.7	2.1	1.8	2.4	6.6	9.4	8.9	8.2	9.1	9.0	7.9	4.3	2.5	3.4	3.2	6.8	7.2	3.1	2.1	2.4	3.6	2.6	3.7	7.8	10.7	10.4	8.5	8.4	10.0	[illegible]	6.0	6.7	8.8	7.6
4.4	3.0	1.9	.7	.7	.8	4.2	11.6	7.7	9.6	10.4	7.2	7.2	3.8	1.8	3.1	6.5	7.8	6.7	3.6	1.9	3.6	3.6	3.7	4.2	10.2	14.4	11.2	11.8	13.0	10.3	10.1	10.4	9.3	9.6	7.3
8.9	6.5	6.2	6.3	7.5	8.1	11.1	12.2	12.2	11.3	9.8	6.7	6.5	5.1	6.2	7.7	12.6	14.0	14.2	14.7	12.2	11.8	7.9	2.4	4.2	9.1	12.7	11.0	11.4	11.0	12.9	13.8	12.1	9.3	9.1	6.8
8.9	8.4	7.3	6.0	5.0	6.3	7.6	8.0	8.1	10.9	11.3	10.5	10.1	6.8	9.1	8.7	8.5	8.1	9.9	12.9	12.7	8.8	4.2	6.5	8.8	9.7	9.1	11.5	10.9	11.5	11.4	12.8	12.5	11.7	10.4	9.7
3.7	2.9	.5	.8	.8	1.2	.8	.8	1.5	1.5	7.5	9.6	6.6	3.5	2.3	2.3	1.2	1.8	2.2	8.1	10.9	4.9	2.4	9.0	11.5	10.2	10.4	10.8	7.9	6.3	10.3	9.3	10.1	11.2	7.7	3.3
5.7	4.9	2.6	.9	.7	.8	.8	.7	.8	.7	2.2	2.7	1.9	1.5	1.6	2.0	1.3	.7	.7	1.2	2.6	1.9	1.5	1.5	1.7	2.2	2.9	3.2	1.6	1.0	1.0	1.2	2.6	6.0	7.5	7.9
8.8	5.7	4.6	3.9	5.4	4.8	3.8	3.4	2.7	1.5	1.1	1.9	2.4	1.9	2.4	2.6	1.8	1.4	1.2	1.2	1.5	2.4	2.6	1.5	.9	1.2	1.1	1.2	1.6	2.5	2.4	3.7	2.8	4.8	4.8	8.1
5.5	4.7	5.6	5.3	7.5	7.6	8.1	8.3	6.8	5.3	5.4	6.3	7.1	5.6	5.6	5.1	4.5	4.8	3.9	4.3	4.5	4.8	6.0	3.9	3.6	3.5	3.0	2.5	3.0	4.0	3.9	3.7	3.9	3.8	2.4	4.4
5.1	3.7	3.6	4.5	4.8	5.3	6.0	7.2	6.9	6.4	6.3	5.3	5.6	6.7	5.9	5.6	5.4	5.8	5.9	6.6	6.0	6.2	5.7	5.1	5.2	5.3	5.1	5.0	5.1	5.4	5.3	5.1	5.0	4.8	4.0	4.2
4.5	5.1	4.7	4.4	4.8	3.8	4.9	5.5	6.3	6.1	5.8	5.9	4.6	4.0	4.1	4.6	5.1	5.1	5.3	5.9	6.0	5.7	4.8	4.5	5.1	4.7	4.9	5.2	5.1	5.2	5.5	5.5	5.3	5.0	5.0	4.5
4.1	3.8	5.1	4.8	4.4	4.5	4.2	4.3	4.3	4.9	4.9	5.7	6.1	4.8	4.1	3.9	4.0	4.6	4.7	5.0	4.8	4.9	4.2	3.8	3.7	4.4	4.8	4.7	4.2	4.8	5.4	5.4	5.9	5.0	4.4	4.7
2.3	2.4	3.3	4.0	4.4	5.2	5.7	5.4	5.2	5.0	4.7	4.5	4.2	4.1	5.2	6.1	6.7	6.0	5.3	4.5	3.9	3.0	2.2	1.8	2.6	3.2	2.5	2.3	2.3	2.0	2.0	1.9	2.1	2.3	2.9	2.5
2.3	2.4	2.8	3.1	3.5	4.1	4.6	4.7	4.4	4.7	5.0	4.9	5.5	6.1	6.4	6.6	6.2	5.2	4.3	4.1	4.0	3.5	2.9	2.3	2.0	2.0	2.1	2.1	2.1	1.9	1.8	1.8	1.8	1.9	2.5	2.4

ATOVS : MEAN O−B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C) FIGURE 30
AUGUST 1999 : HIRS11 Channel (500−700 hPa)
NOAA−15, USING ALL OBSERVATIONS


−1.3 −1.3 −1.1 −1.1 −1.3 −1.2 −1.3 −1.3 −1.4 −1.0 −.7 −.6 −.7 −1.0 −.8 −.6 −.8 −.9 −.9 −.6 −.6 −.4 −.5 −1.1 −1.0 −.9 −.7 −.8 −.7 −.6 −.4 −.5 −1.0 −1.2 −.9 −1.1
−1.6 −1.6 −1.2 −.8 −.8 [illegible] [illegible] −.9 [illegible] [illegible] −1.5 −1.8 −2.1 −2.5 −2.1 −2.0 −1.6 −1.4 −1.7 −1.6 −2.1 −1.0 −.5 −1.4 −1.5 −1.4 −1.3 −1.4 −2.4 −2.0 −1.6 −1.1 −.8 −.8 −.8 −1.2
−1.7 −2.5 −3.3 −2.9 −2.8 −2.5 −2.2 −2.2 −1.9 −1.6 −2.2 −2.4 −2.6 −3.5 −2.0 −1.3 −1.4 −1.4 −1.2 −1.6 −1.9 −1.6 −1.6 −1.4 −1.7 −1.4 −1.7 −2.5 −3.0 −1.9 −1.6 −1.8 −2.3 −2.3 −2.4 −2.1
−2.9 −2.4 −1.7 −1.1 −2.5 −2.8 −2.1 −1.6 −1.6 −1.7 −1.8 −2.7 −2.3 −2.4 −2.3 −1.1 −1.1 [illegible] −2.0 −2.2 −1.2 −1.4 −1.9 −1.6 −.8 −.6 −1.7 −2.6 −2.6 −3.0 −2.4 −2.2 −2.4 −2.1 −2.5 −2.1
−3.2 −2.5 −1.4 −1.1 −.7 −1.0 −3.6 −2.7 −2.5 −2.1 −2.0 −2.3 −2.3 −1.4 −.4 −.4 −.5 −2.5 −4.1 −2.2 −1.1 [illegible] .2 −1.9 2.4 .8 −.7 −1.6 −2.4 −1.2 −1.7 −1.2 −1.8 −1.3 −1.7 −2.5
−.2 .1 1.2 1.5 1.6 1.7 −.5 −3.6 −3.7 −3.6 −4.0 −3.8 −2.3 .8 1.6 .9 .8 −1.5 −2.1 .4 1.7 3.8 .5 .8 1.8 −2.6 −4.1 −3.7 −2.4 −1.6 −4.0 −3.0 −.6 −1.2 −2.6 −1.3
.9 1.6 1.9 2.8 2.7 2.6 1.6 −5.3 −1.7 −4.3 −4.9 −1.5 −.4 1.8 2.3 1.3 −1.1 −2.9 −1.9 .7 .9 .0 −.7 −.5 −.2 −6.0 −13.7 −9.7 −8.5 −8.3 −5.0 −5.2 −4.7 −4.2 −4.6 −1.3
−2.3 −.5 −.1 .3 −.3 −1.9 −5.2 −9.5 −9.6 −6.8 −4.2 −.3 .3 1.1 .6 −1.8 −8.7 −8.5 −9.4 −9.5 −7.1 −6.8 −1.3 1.4 −.9 −6.7 −11.1 −10.8 −11.0 −7.6 −13.0 −12.9 −8.1 −4.7 −3.2 −.8
−2.4 −1.6 −.7 .0 −.2 −.9 −1.4 −1.7 −2.1 −6.1 −7.5 −6.0 −4.2 −.7 −3.8 −3.6 −2.6 −1.0 −4.8 −11.7 −11.8 −4.5 .5 −2.3 −5.9 −6.8 −5.3 −9.6 −7.9 −10.2 −10.1 −11.9 −9.6 −7.2 −5.1 −3.9
1.5 2.8 3.0 2.9 2.7 2.6 2.6 2.4 1.9 1.0 −3.6 −4.7 −1.1 1.7 1.4 1.6 2.5 2.2 1.4 −2.2 −4.7 .1 1.2 −4.3 −8.4 −6.9 −7.2 −7.3 −2.1 −.4 1.1 −4.5 −6.4 −7.5 −2.7 1.1
.8 1.2 2.3 2.6 2.4 2.3 2.4 2.2 2.0 2.4 .3 .5 −.2 .7 1.5 1.0 2.1 2.5 3.2 2.2 .2 .1 2.1 2.2 1.7 .9 .5 .9 2.3 2.3 1.7 1.6 1.4 .0 −1.2 −1.2
−4.3 −.9 .2 .6 .0 .9 1.5 1.3 1.5 1.8 2.1 2.1 1.7 2.6 2.0 1.4 1.6 1.3 1.8 1.8 .7 .8 1.9 2.4 1.9 1.6 1.8 1.8 1.5 1.3 .2 −.7 .0 .0 .3 −4.2
−1.2 −.9 −1.8 −1.4 −3.3 −3.9 −4.1 −4.1 −3.6 −1.8 −.9 −2.1 −2.4 −.9 −1.3 −1.1 −.4 −1.1 .4 .1 .2 .4 −.5 .6 .5 .7 1.1 1.0 .7 .1 −.3 .0 −.4 .0 .6 .7
−2.2 −1.0 −1.1 −2.0 −2.6 −2.7 −2.6 −4.3 −4.7 −3.5 −3.7 −2.3 −2.4 −3.4 −3.7 −3.6 −3.6 −4.1 −4.3 −4.8 −3.4 −2.7 −2.3 −1.8 −2.6 −3.0 −3.2 −2.9 −3.0 −2.8 −2.4 −2.0 −1.3 −1.1 −.8 −1.2
−3.2 −3.9 −3.4 −2.9 −3.7 −2.0 −2.3 −2.8 −4.2 −4.7 −4.8 −5.0 −3.7 −2.8 −3.3 −4.8 −4.7 −4.6 −5.2 −4.8 −5.1 −5.4 −4.0 −4.3 −5.3 −5.0 −5.5 −6.2 −5.2 −4.5 −4.8 −5.0 −4.6 −4.1 −3.7 −3.2
−4.4 −4.2 −5.2 −4.6 −5.0 −5.1 −4.2 −3.9 −3.7 −3.8 −3.8 −4.9 −5.9 −5.2 −4.2 −4.6 −5.0 −5.5 −5.7 −5.5 −5.0 −4.6 −3.4 −2.4 −2.6 −5.0 −5.7 −5.2 −3.5 −4.6 −5.1 −4.9 −6.0 −6.2 −5.6 −5.5
−2.8 −2.6 −2.8 −3.2 −3.4 −3.9 −4.3 −4.7 −2.7 −2.4 −3.1 −2.4 −4.6 −4.2 −5.4 −5.2 −6.5 −5.4 −4.8 −3.5 −1.8 .0 1.3 2.1 1.6 .7 2.4 4.7 3.6 3.6 2.7 1.5 .9 .7 −1.5 −2.9
−2.7 −2.6 −1.8 .1 .6 −.5 −1.2 .0 .6 −1.8 −3.0 −3.7 −4.0 −3.8 −3.9 −3.7 −3.4 −2.7 −1.8 −1.3 −.7 .0 1.5 2.8 3.0 3.5 2.8 2.4 2.0 1.8 1.0 .8 .3 2.0 −1.3 −2.9

ATOVS : SD O–B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
AUGUST 1999 : HIRS11 channel (500–700 hPa)
NOAA–15, USING ALL OBSERVATIONS

FIGURE 31

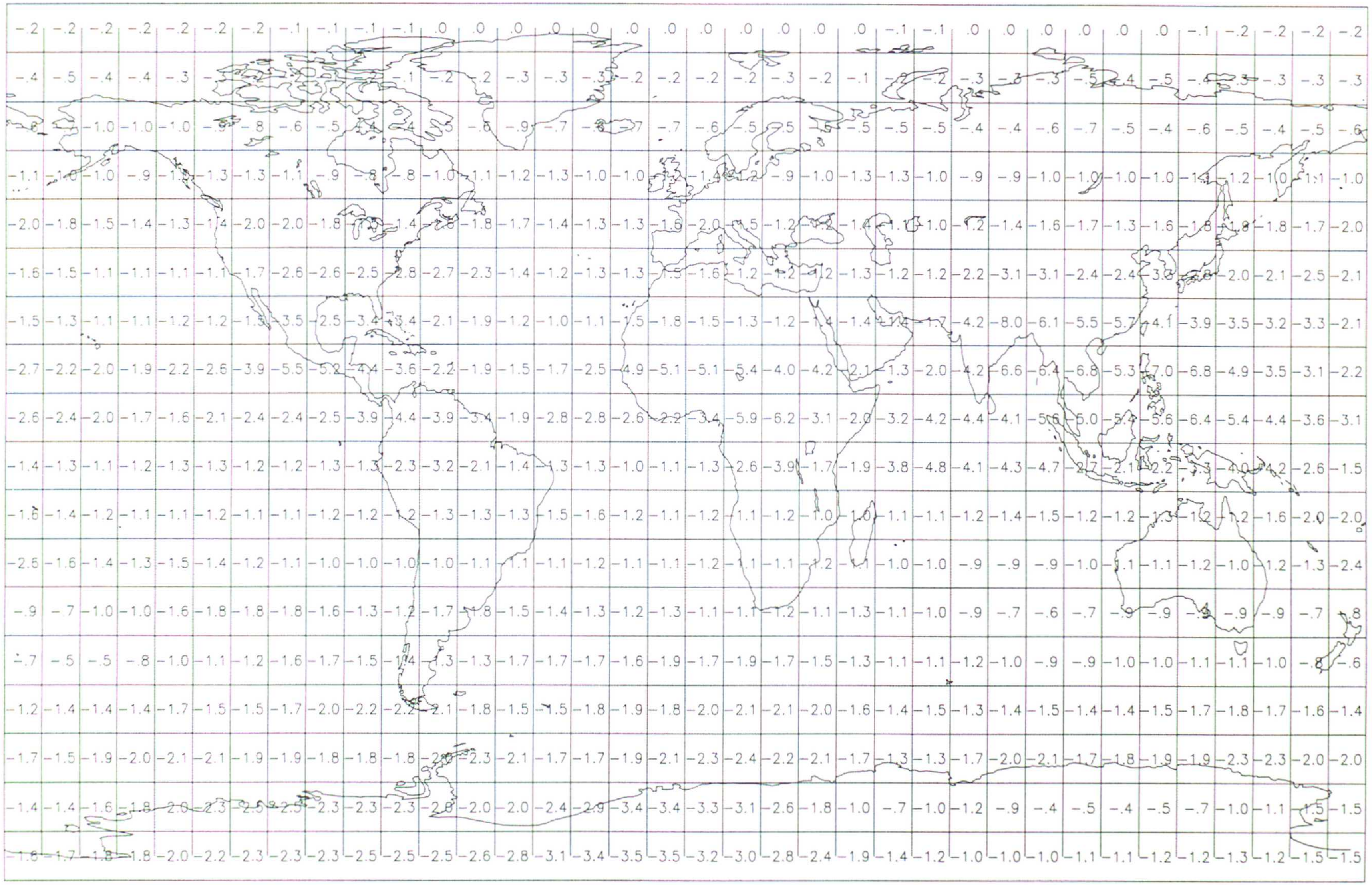


3.6	3.5	3.2	2.9	3.0	3.2	3.1	3.0	3.3	3.4	3.6	3.3	2.7	2.9	3.0	2.7	2.8	2.9	2.8	3.0	2.9	2.7	2.8	3.6	3.5	3.6	3.5	3.5	3.7	3.5	3.5	3.6	3.9	3.9	3.7	3.7
3.8	3.9	3.8	3.6	3.2	[illegible]	[illegible]	3.0	[illegible]	3.5	3.5	3.7	4.1	3.7	3.2	3.6	3.2	3.0	3.2	3.3	4.0	3.4	3.3	3.8	4.1	3.9	3.9	4.1	4.5	4.4	4.5	3.9	3.5	3.3	3.5	3.5
4.2	4.8	5.3	5.2	4.9	5.2	5.0	4.3	4.2	3.7	4.1	4.8	5.5	6.0	4.6	3.5	3.8	3.5	3.4	3.3	3.9	4.4	4.8	4.0	4.6	4.4	4.4	4.8	5.0	4.4	4.4	4.9	4.4	4.2	4.5	4.6
5.3	4.7	4.9	4.1	4.8	5.7	5.8	5.2	4.9	4.7	4.5	5.6	5.8	6.0	5.8	4.6	4.5	5.4	5.9	3.9	5.1	5.8	6.4	5.8	5.5	4.8	5.7	6.1	6.0	5.8	6.2	5.9	6.0	5.0	5.4	5.1
7.0	6.2	5.3	4.8	4.3	5.7	7.1	7.1	7.3	6.0	5.5	6.5	6.5	5.8	5.3	5.2	5.4	6.6	8.3	5.9	6.0	5.6	6.1	3.8	3.7	4.8	5.8	6.1	6.5	6.0	6.9	6.8	5.8	6.1	6.6	7.1
5.1	4.6	2.9	2.6	2.3	3.1	6.5	9.2	10.0	9.3	9.3	8.6	8.1	4.4	3.1	3.8	3.7	5.8	6.2	3.5	2.8	4.2	4.6	3.0	3.6	8.1	10.7	10.1	8.5	8.3	9.9	[illegible]	6.6	7.2	9.2	8.1
5.2	3.3	2.6	1.6	1.6	1.9	5.1	12.4	8.5	10.3	11.2	7.6	7.8	4.3	1.8	3.4	6.5	6.9	5.7	3.8	2.8	4.1	3.4	3.7	4.6	11.0	15.4	12.0	13.0	14.1	10.7	10.3	10.6	10.0	10.3	7.6
10.1	7.9	7.4	7.6	8.9	9.1	12.0	13.2	13.1	12.2	11.2	7.8	7.3	5.8	6.8	8.0	13.2	15.2	15.5	15.7	13.2	12.5	8.1	2.7	4.7	9.4	13.7	11.3	12.2	11.6	13.7	14.9	12.7	10.5	10.6	8.3
10.8	10.0	8.8	6.9	5.3	7.2	8.1	8.6	8.5	11.1	12.5	11.3	11.1	7.3	9.4	8.6	8.2	8.1	9.8	13.9	14.1	9.4	5.0	7.6	9.9	10.5	9.6	11.9	11.2	11.9	11.7	13.7	13.5	13.1	11.4	11.7
4.8	3.9	1.5	1.7	1.6	2.1	1.5	1.7	2.7	3.0	7.9	10.8	8.4	4.3	2.8	3.1	2.1	2.5	3.2	9.8	12.9	5.4	3.3	10.0	12.7	11.0	11.2	11.8	8.9	7.0	8.4	9.7	11.0	11.8	8.9	4.5
6.4	5.8	3.0	1.3	1.1	1.3	1.3	1.4	1.6	2.3	3.8	4.2	2.6	2.2	2.5	3.4	2.4	1.6	2.2	2.5	3.3	2.2	1.8	2.1	2.2	2.8	3.9	4.4	2.5	1.5	1.6	1.8	2.5	5.7	7.7	8.0
8.6	5.8	4.8	4.6	5.9	5.2	4.4	4.3	3.2	2.5	2.8	3.1	3.5	3.0	3.0	3.0	2.6	2.3	2.5	2.7	2.2	3.4	3.4	2.1	1.3	1.7	1.9	1.9	2.3	2.8	2.7	3.8	3.1	5.5	5.2	8.5
6.1	5.7	6.8	6.2	8.7	8.5	9.3	9.8	8.1	6.7	6.8	8.4	8.5	6.7	6.6	6.1	5.7	5.9	4.9	5.9	5.7	5.8	6.9	4.8	4.6	4.5	3.9	3.6	4.2	5.0	4.5	4.4	4.6	4.7	3.4	5.2
6.5	5.9	5.7	6.5	6.9	7.4	7.7	9.3	8.9	8.3	8.0	7.2	7.0	8.2	7.5	7.2	7.0	7.6	7.5	8.4	7.8	8.1	7.4	6.7	7.1	7.1	7.0	7.0	7.1	7.5	7.1	6.5	6.4	6.1	5.1	5.4
6.6	7.5	7.1	7.0	7.6	6.4	7.1	7.7	8.7	8.3	7.9	7.8	6.4	5.6	5.7	6.5	7.2	7.3	7.5	8.1	8.0	7.6	6.6	6.4	7.3	6.9	7.5	8.0	7.8	7.9	8.2	8.0	7.6	7.0	6.7	6.3
5.9	5.8	7.4	6.5	6.7	7.0	6.7	6.8	6.7	7.3	7.4	8.8	9.2	7.2	6.1	5.9	5.9	6.5	6.8	7.3	6.8	6.7	6.1	5.8	5.7	6.4	7.1	7.1	6.5	7.2	8.1	8.1	8.3	7.2	6.3	6.6
4.0	3.9	5.5	6.6	7.2	8.6	9.1	8.4	8.4	8.3	7.6	7.6	6.8	6.5	8.3	10.1	10.7	9.6	8.5	7.6	6.7	5.4	4.5	3.5	4.7	5.7	5.0	5.5	5.1	4.3	3.9	3.3	3.7	4.1	5.5	4.4
5.1	4.9	5.6	6.5	7.1	7.8	8.3	9.1	8.6	8.3	8.5	8.1	8.8	9.8	10.4	11.0	10.6	9.2	8.0	7.8	7.1	6.3	5.5	4.8	4.5	4.5	4.6	4.8	4.5	4.1	3.5	3.4	3.4	4.2	5.9	5.3

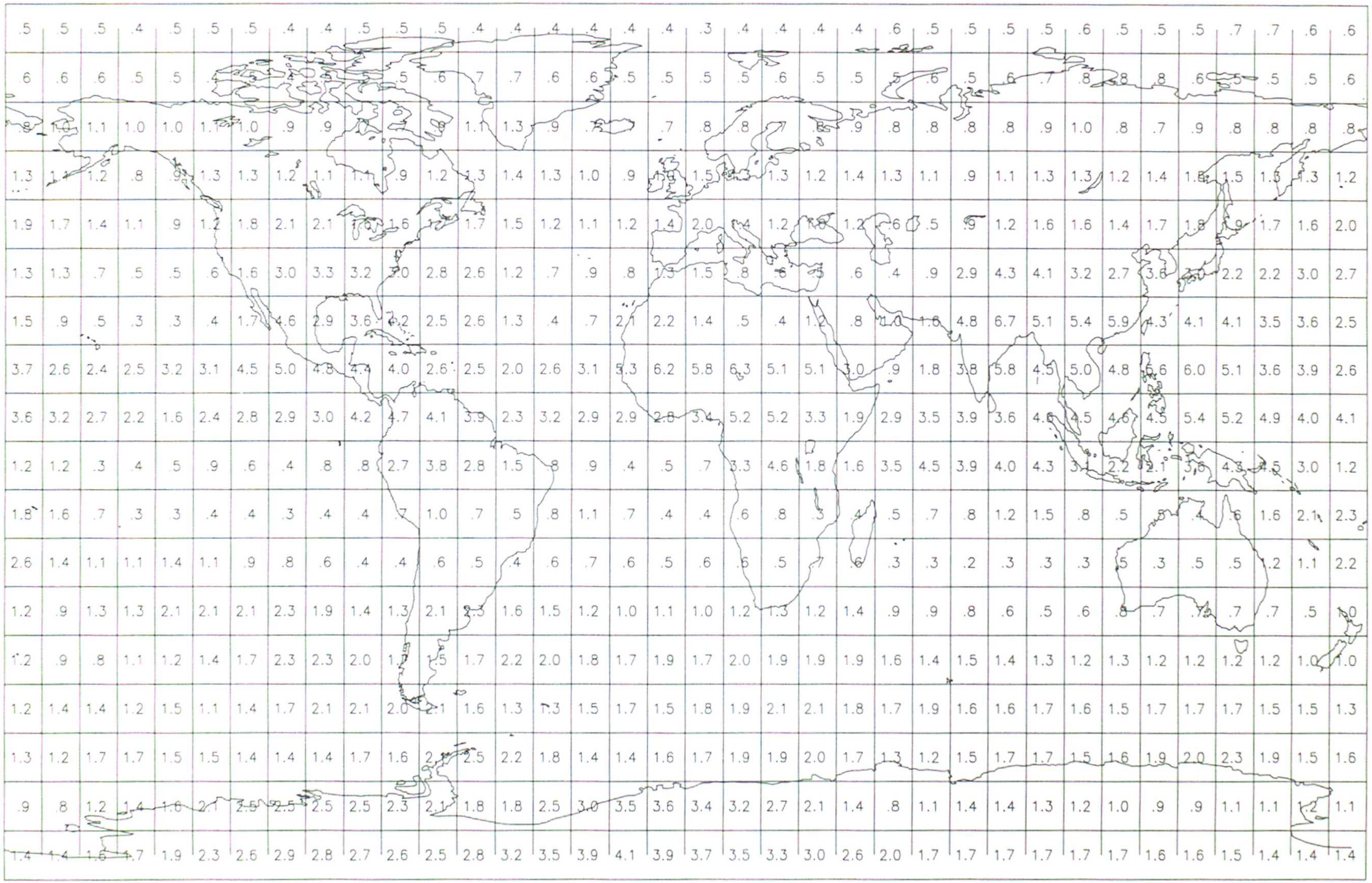
ATOVS : MEAN O–B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C) FIGURE 32

AUGUST 1999 : HIRS4 channel (400 hPa)

NOAA–15, USING ALL OBSERVATIONS

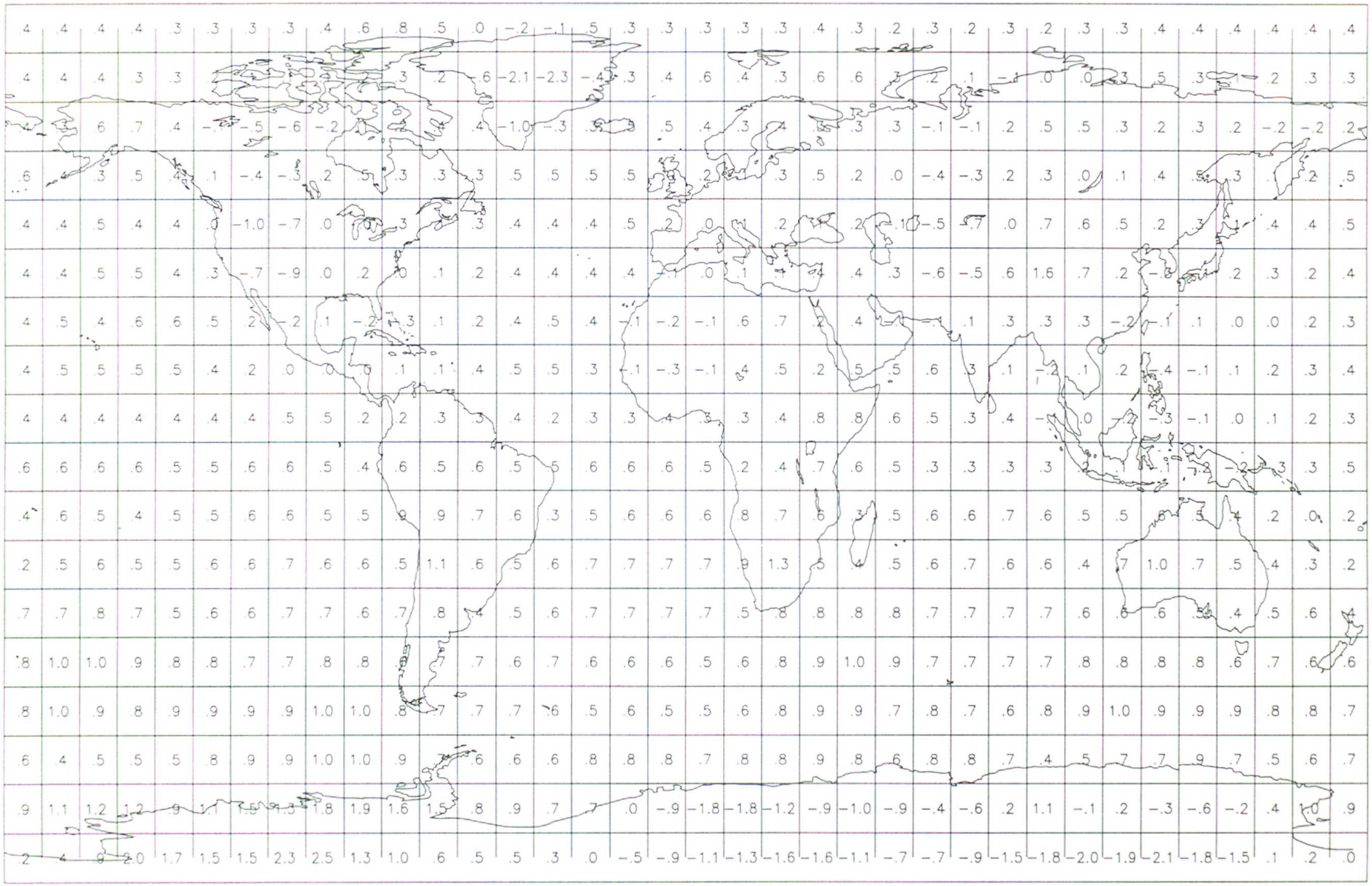

-.2 -.2 -.2 -.2 -.2 -.2 -.2 -.1 -.1 -.1 -.1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 -.1 -.1 .0 .0 .0 .0 .0 .0 -.1 -.2 -.2 -.2 -.2
-.4 -.5 -.4 -.4 -.3 [illegible] [illegible] [illegible] [illegible] [illegible] -.1 -.2 -.2 -.3 -.3 -.3 -.2 -.2 -.2 -.2 -.3 -.2 -.1 -.2 -.2 -.3 -.3 -.3 -.5 -.4 -.5 -.4 -.3 -.3 -.3 -.3
-.6 [illegible] -1.0 -1.0 -1.0 -.9 -.8 -.6 -.5 -.4 -.4 -.5 -.6 -.9 -.7 [illegible] -.7 -.7 -.6 -.5 -.5 -.5 -.5 -.5 -.5 -.4 -.4 -.6 -.7 -.5 -.4 -.6 -.5 -.4 -.5 -.6
-1.1 -1.0 -1.0 -.9 [illegible] -1.3 -1.3 -1.1 -.9 -.8 -.8 -1.0 -1.1 -1.2 -1.3 -1.0 -1.0 [illegible] -1.4 -1.2 -.9 -1.0 -1.3 -1.3 -1.0 -.9 -.9 -1.0 -1.0 -1.0 -1.0 -1.1 -1.2 -1.0 -1.1 -1.0
-2.0 -1.8 -1.5 -1.4 -1.3 -1.4 -2.0 -2.0 -1.8 [illegible] -1.4 [illegible] -1.8 -1.7 -1.4 -1.3 -1.3 -1.6 -2.0 -1.5 -1.2 -1.2 -1.4 -1.1 -1.0 -1.2 -1.4 -1.6 -1.7 -1.3 -1.6 -1.8 -1.8 -1.8 -1.7 -2.0
-1.6 -1.5 -1.1 -1.1 -1.1 -1.1 -1.7 -2.6 -2.6 -2.5 -2.8 -2.7 -2.3 -1.4 -1.2 -1.3 -1.3 -1.5 -1.6 -1.2 -1.2 -1.2 -1.3 -1.2 -1.2 -2.2 -3.1 -3.1 -2.4 -2.4 -3.6 [illegible] -2.0 -2.1 -2.5 -2.1
-1.5 -1.3 -1.1 -1.1 -1.2 -1.2 -1.5 -3.5 -2.5 -3.4 -3.4 -2.1 -1.9 -1.2 -1.0 -1.1 -1.5 -1.8 -1.5 -1.3 -1.2 -1.4 -1.4 -1.4 -1.7 -4.2 -8.0 -6.1 -5.5 -5.7 -4.1 -3.9 -3.5 -3.2 -3.3 -2.1
-2.7 -2.2 -2.0 -1.9 -2.2 -2.6 -3.9 -5.5 -5.2 -4.4 -3.6 -2.2 -1.9 -1.5 -1.7 -2.5 -4.9 -5.1 -5.1 -5.4 -4.0 -4.2 -2.1 -1.3 -2.0 -4.2 -6.6 -6.4 -6.8 -5.3 -7.0 -6.8 -4.9 -3.5 -3.1 -2.2
-2.6 -2.4 -2.0 -1.7 -1.6 -2.1 -2.4 -2.4 -2.5 -3.9 -4.4 -3.9 -3.4 -1.9 -2.8 -2.8 -2.6 -2.2 -3.4 -5.9 -6.2 -3.1 -2.0 -3.2 -4.2 -4.4 -4.1 -5.6 -5.0 -5.4 -5.6 -6.4 -5.4 -4.4 -3.6 -3.1
-1.4 -1.3 -1.1 -1.2 -1.3 -1.3 -1.2 -1.2 -1.3 -1.3 -2.3 -3.2 -2.1 -1.4 -1.3 -1.3 -1.0 -1.1 -1.3 -2.6 -3.9 -1.7 -1.9 -3.8 -4.8 -4.1 -4.3 -4.7 -2.7 -2.1 -2.2 [illegible] -4.0 -4.2 -2.6 -1.5
-1.6 -1.4 -1.2 -1.1 -1.1 -1.2 -1.1 -1.1 -1.2 -1.2 -1.2 -1.3 -1.3 -1.3 -1.5 -1.6 -1.2 -1.1 -1.2 -1.1 -1.2 -1.0 -1.0 -1.1 -1.1 -1.2 -1.4 -1.5 -1.2 -1.2 -1.3 -1.2 -1.2 -1.6 -2.0 -2.0
-2.6 -1.6 -1.4 -1.3 -1.5 -1.4 -1.2 -1.1 -1.0 -1.0 -1.0 -1.0 -1.1 -1.1 -1.1 -1.2 -1.1 -1.1 -1.2 -1.1 -1.1 -1.2 -1.1 -1.0 -1.0 -.9 -.9 -.9 -1.0 -1.1 -1.1 -1.2 -1.0 -1.2 -1.3 -2.4
-.9 -.7 -1.0 -1.0 -1.6 -1.8 -1.8 -1.8 -1.6 -1.3 -1.2 -1.7 -1.8 -1.5 -1.4 -1.3 -1.2 -1.3 -1.1 -1.1 -1.2 -1.1 -1.3 -1.1 -1.0 -.9 -.7 -.6 -.7 -.9 -.9 [illegible] -.9 -.9 -.7 -.8
-.7 -.5 -.5 -.8 -1.0 -1.1 -1.2 -1.6 -1.7 -1.5 -1.4 -1.3 -1.3 -1.7 -1.7 -1.7 -1.6 -1.9 -1.7 -1.9 -1.7 -1.5 -1.3 -1.1 -1.1 -1.2 -1.0 -.9 -.9 -1.0 -1.0 -1.1 -1.1 -1.0 -.8 -.6
-1.2 -1.4 -1.4 -1.4 -1.7 -1.5 -1.5 -1.7 -2.0 -2.2 -2.2 -2.1 -1.8 -1.5 -1.5 -1.8 -1.9 -1.8 -2.0 -2.1 -2.1 -2.0 -1.6 -1.4 -1.5 -1.3 -1.4 -1.5 -1.4 -1.4 -1.5 -1.7 -1.8 -1.7 -1.6 -1.4
-1.7 -1.5 -1.9 -2.0 -2.1 -2.1 -1.9 -1.9 -1.8 -1.8 -1.8 -2.0 -2.3 -2.1 -1.7 -1.7 -1.9 -2.1 -2.3 -2.4 -2.2 -2.1 -1.7 -1.3 -1.3 -1.7 -2.0 -2.1 -1.7 -1.8 -1.9 -1.9 -2.3 -2.3 -2.0 -2.0
-1.4 -1.4 -1.6 -1.8 -2.0 -2.3 -2.5 -2.5 -2.3 -2.3 -2.3 -2.8 -2.0 -2.0 -2.4 -2.9 -3.4 -3.4 -3.3 -3.1 -2.6 -1.8 -1.0 -.7 -1.0 -1.2 -.9 -.4 -.5 -.4 -.5 -.7 -1.0 -1.1 -1.5 -1.5
-1.8 -1.7 -1.8 -1.8 -2.0 -2.2 -2.3 -2.3 -2.3 -2.5 -2.5 -2.5 -2.6 -2.8 -3.1 -3.4 -3.5 -3.5 -3.2 -3.0 -2.8 -2.4 -1.9 -1.4 -1.2 -1.0 -1.0 -1.0 -1.1 -1.1 -1.2 -1.2 -1.3 -1.2 -1.5 -1.5

ATOVS : SD O–B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)   FIGURE 33
AUGUST 1999   : HIRS4 channel (400 hPa)
NOAA–15, USING ALL OBSERVATIONS



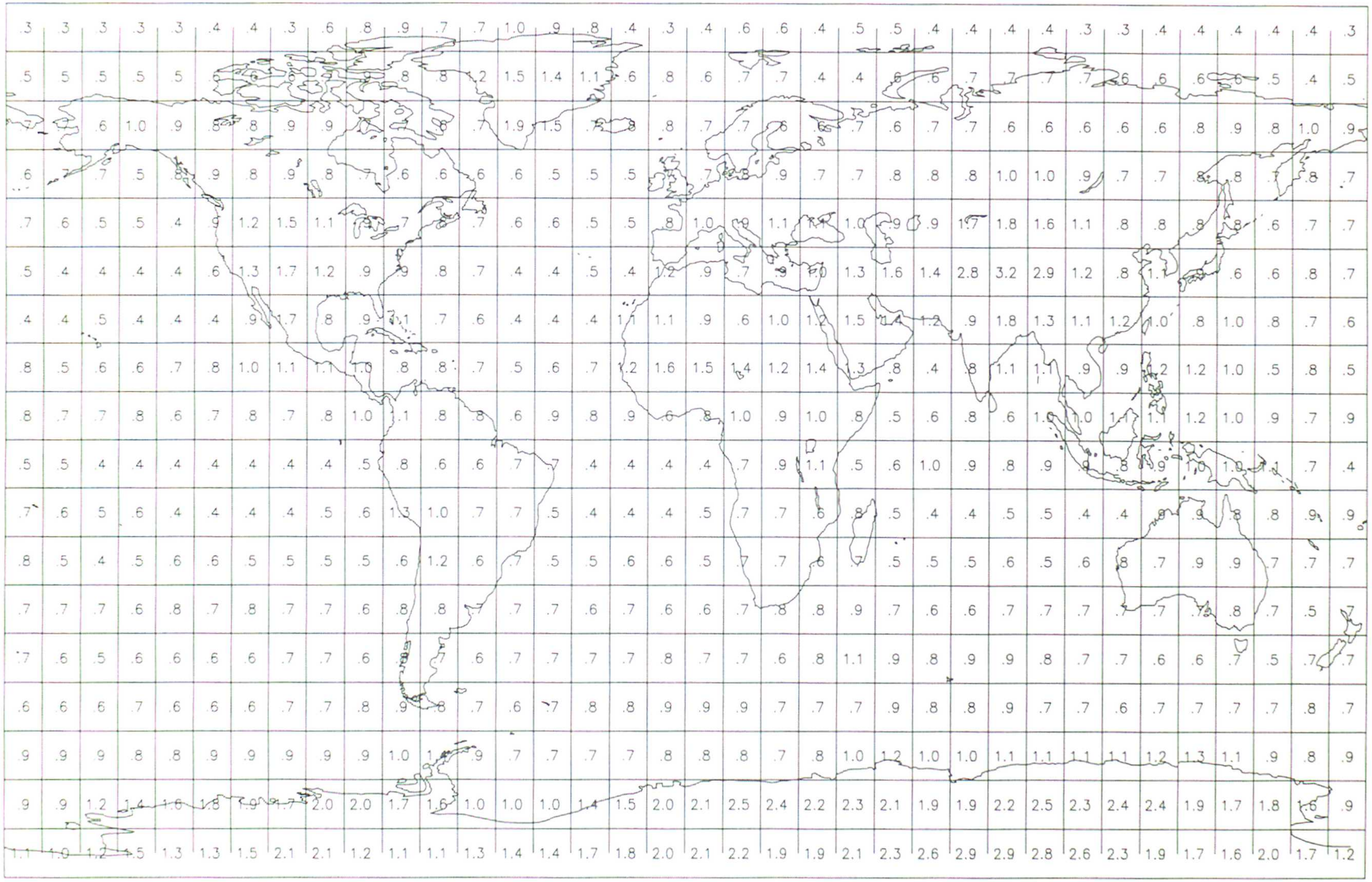
.5	.5	.5	.4	.5	.5	.5	.4	.4	.5	.5	.5	.4	.4	.4	.4	.4	.4	.3	.4	.4	.4	.4	.6	.5	.5	.5	.5	.6	.5	.5	.5	.7	.7	.6	.6
.6	.6	.6	.5	.5	.4	.5	.4	.5	[illegible]	.5	.6	.7	.7	.6	.6	.5	.5	.5	.5	.6	.5	.5	.5	.6	.5	.6	.7	.8	.8	.8	.6	.5	.5	.5	.6
.8	1.0	1.1	1.0	1.0	1.1	1.0	.9	.9	.7	.7	.8	1.1	1.3	.9	.7	[illegible]	.7	.8	.8	.7	.8	.9	.8	.8	.8	.8	.9	1.0	.8	.7	.9	.8	.8	.8	.8
1.3	1.1	1.2	.8	.9	1.3	1.3	1.2	1.1	1.1	.9	1.2	1.3	1.4	1.3	1.0	.9	1.0	1.5	1.3	1.3	1.2	1.4	1.3	1.1	.9	1.1	1.3	1.3	1.2	1.4	1.8	1.5	1.3	1.3	1.2
1.9	1.7	1.4	1.1	.9	1.2	1.8	2.1	2.1	1.0	1.6	[illegible]	1.7	1.5	1.2	1.1	1.2	1.4	2.0	1.4	1.2	1.0	1.2	.6	.5	.9	1.2	1.6	1.6	1.4	1.7	1.8	1.9	1.7	1.6	2.0
1.3	1.3	.7	.5	.5	.6	1.6	3.0	3.3	3.2	3.0	2.8	2.6	1.2	.7	.9	.8	1.3	1.5	.8	.6	.5	.6	.4	.9	2.9	4.3	4.1	3.2	2.7	3.6	3.0	2.2	2.2	3.0	2.7
1.5	.9	.5	.3	.3	.4	1.7	4.6	2.9	3.6	4.2	2.5	2.6	1.3	.4	.7	2.1	2.2	1.4	.5	.4	1.2	.8	1.0	1.6	4.8	6.7	5.1	5.4	5.9	4.3	4.1	4.1	3.5	3.6	2.5
3.7	2.6	2.4	2.5	3.2	3.1	4.5	5.0	4.8	4.4	4.0	2.6	2.5	2.0	2.6	3.1	5.3	6.2	5.8	6.3	5.1	5.1	3.0	.9	1.8	3.8	5.8	4.5	5.0	4.8	5.6	6.0	5.1	3.6	3.9	2.6
3.6	3.2	2.7	2.2	1.6	2.4	2.8	2.9	3.0	4.2	4.7	4.1	3.9	2.3	3.2	2.9	2.9	2.8	3.4	5.2	5.2	3.3	1.9	2.9	3.5	3.9	3.6	4.6	4.5	4.6	4.5	5.4	5.2	4.9	4.0	4.1
1.2	1.2	.3	.4	.5	.9	.6	.4	.8	.8	2.7	3.8	2.8	1.5	.8	.9	.4	.5	.7	3.3	4.6	1.8	1.6	3.5	4.5	3.9	4.0	4.3	3.1	2.2	2.1	3.6	4.3	4.5	3.0	1.2
1.8	1.6	.7	.3	.3	.4	.4	.3	.4	.4	.7	1.0	.7	.5	.8	1.1	.7	.4	.4	.6	.8	.3	.4	.5	.7	.8	1.2	1.5	.8	.5	.5	.4	.6	1.6	2.1	2.3
2.6	1.4	1.1	1.1	1.4	1.1	.9	.8	.6	.4	.4	.6	.5	.4	.6	.7	.6	.5	.6	.6	.5	.7	.6	.3	.3	.2	.3	.3	.3	.5	.3	.5	.5	1.2	1.1	2.2
1.2	.9	1.3	1.3	2.1	2.1	2.1	2.3	1.9	1.4	1.3	2.1	2.3	1.6	1.5	1.2	1.0	1.1	1.0	1.2	1.3	1.2	1.4	.9	.9	.8	.6	.5	.6	.8	.7	.7	.7	.7	.5	1.0
1.2	.9	.8	1.1	1.2	1.4	1.7	2.3	2.3	2.0	[illegible]	1.5	1.7	2.2	2.0	1.8	1.7	1.9	1.7	2.0	1.9	1.9	1.9	1.6	1.4	1.5	1.4	1.3	1.2	1.3	1.2	1.2	1.2	1.2	1.0	1.0
1.2	1.4	1.4	1.2	1.5	1.1	1.4	1.7	2.1	2.1	2.0	2.1	1.6	1.3	1.3	1.5	1.7	1.5	1.8	1.9	2.1	2.1	1.8	1.7	1.9	1.6	1.6	1.7	1.6	1.5	1.7	1.7	1.7	1.5	1.5	1.3
1.3	1.2	1.7	1.7	1.5	1.5	1.4	1.4	1.4	1.7	1.6	[illegible]	2.5	2.2	1.8	1.4	1.4	1.6	1.7	1.9	1.9	2.0	1.7	1.3	1.2	1.5	1.7	1.7	1.5	1.6	1.9	2.0	2.3	1.9	1.5	1.6
.9	.8	1.2	1.4	1.6	2.1	2.5	2.5	2.5	2.5	2.3	2.1	1.8	1.8	2.5	3.0	3.5	3.6	3.4	3.2	2.7	2.1	1.4	.8	1.1	1.4	1.4	1.3	1.2	1.0	.9	.9	1.1	1.1	1.2	1.1
1.4	1.4	1.6	1.7	1.9	2.3	2.6	2.9	2.8	2.7	2.6	2.5	2.8	3.2	3.5	3.9	4.1	3.9	3.7	3.5	3.3	3.0	2.6	2.0	1.7	1.7	1.7	1.7	1.7	1.7	1.6	1.6	1.5	1.4	1.4	1.4

ATOVS : MEAN O–B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C) FIGURE 34
AUGUST 1999 : AMSUA–5 Channel (700 hPa)
NOAA–15, USING ALL OBSERVATIONS


.4 .4 .4 .4 .3 .3 .3 .3 .4 .6 .8 .5 .0 –.2 –.1 .5 .3 .3 .3 .3 .3 .4 .3 .2 .3 .2 .3 .2 .3 .3 .4 .4 .4 .4 .4 .4
.4 .4 .4 .3 .3 [illegible] [illegible] [illegible] [illegible] [illegible] .3 .2 .6 –2.1 –2.3 –.4 .3 .4 .6 .4 .3 .6 .6 .3 .2 .1 –.1 .0 .0 .3 .5 .3 .1 .2 .3 .3
.4 .3 .6 .7 .4 [illegible] –.5 –.6 –.2 [illegible] .2 .4 .4 –1.0 –.3 .3 .5 .5 .4 .3 .4 .3 .3 .3 –.1 –.1 .2 .5 .5 .3 .2 .3 .2 –.2 –.2 .2
.6 .4 .3 .5 .4 .1 –.4 –.3 .2 .5 .3 .3 .3 .5 .5 .5 .5 [illegible] .2 .1 .3 .5 .2 .0 –.4 –.3 .2 .3 .0 .1 .4 .5 .3 [illegible] .2 .5
.4 .4 .5 .4 .4 .0 –1.0 –.7 .0 .0 .3 [illegible] .3 .4 .4 .4 .5 .2 .0 .1 .2 .1 .2 –.1 –.5 .7 .0 .7 .6 .5 .2 .3 .1 .4 .4 .5
.4 .4 .5 .5 .4 .3 –.7 –.9 .0 .2 .0 .1 .2 .4 .4 .4 .4 –.1 .0 .1 .1 .4 .4 .3 –.6 –.5 .6 1.6 .7 .2 –.3 .1 .2 .3 .2 .4
.4 .5 .4 .6 .6 .5 .2 –.2 .1 –.2 .3 .1 .2 .4 .5 .4 –.1 –.2 –.1 .6 .7 .2 .4 –.1 –.1 .1 .3 .3 .3 –.2 –.1 .1 .0 .0 .2 .3
.4 .5 .5 .5 .5 .4 .2 .0 .0 .0 .1 .1 .4 .5 .5 .3 –.1 –.3 –.1 .4 .5 .2 .5 .5 .6 .3 .1 –.2 .1 .2 –.4 –.1 .1 .2 .3 .4
.4 .4 .4 .4 .4 .4 .4 .5 .5 .2 .2 .3 .3 .4 .2 .3 .3 .4 .3 .3 .4 .8 .8 .6 .5 .3 .4 –.1 .0 –.2 –.3 –.1 .0 .1 .2 .3
.6 .6 .6 .6 .5 .5 .6 .6 .5 .4 .6 .5 .6 .5 .5 .6 .6 .6 .5 .2 .4 .7 .6 .5 .3 .3 .3 .3 .2 .1 –.1 .2 –.2 .3 .3 .5
.4 .6 .5 .4 .5 .5 .6 .6 .5 .5 .9 .9 .7 .6 .3 .5 .6 .6 .6 .8 .7 .6 .3 .5 .6 .6 .7 .6 .5 .5 .6 .5 .4 .2 .0 .2
.2 .5 .6 .5 .5 .6 .6 .7 .6 .6 .5 1.1 .6 .5 .6 .7 .7 .7 .7 .9 1.3 .5 .4 .5 .6 .7 .6 .6 .4 .7 1.0 .7 .5 .4 .3 .2
.7 .7 .8 .7 .5 .6 .6 .7 .7 .6 .7 .8 .4 .5 .6 .7 .7 .7 .7 .5 .8 .8 .8 .8 .7 .7 .7 .7 .6 .6 .6 .5 .4 .5 .6 .4
.8 1.0 1.0 .9 .8 .8 .7 .7 .8 .8 .6 .7 .7 .6 .7 .6 .6 .6 .5 .6 .8 .9 1.0 .9 .7 .7 .7 .7 .8 .8 .8 .8 .6 .7 .6 .6
.8 1.0 .9 .8 .9 .9 .9 .9 1.0 1.0 .8 .7 .7 .7 .6 .5 .6 .5 .5 .6 .8 .9 .9 .7 .8 .7 .6 .8 .9 1.0 .9 .9 .9 .8 .8 .7
.6 .4 .5 .5 .5 .8 .9 .9 1.0 1.0 .9 .7 .6 .6 .6 .8 .8 .8 .7 .8 .8 .9 .8 .6 .8 .8 .7 .4 .5 .7 .7 .9 .7 .5 .6 .7
.9 1.1 1.2 1.2 .9 1.1 1.5 1.3 1.8 1.9 1.6 1.5 .8 .9 .7 .7 .0 –.9 –1.8 –1.8 –1.2 –.9 –1.0 –.9 –.4 –.6 .2 1.1 –.1 .2 –.3 –.6 –.2 .4 1.0 .9
.2 .4 .8 2.0 1.7 1.5 1.5 2.3 2.5 1.3 1.0 .6 .5 .5 .3 .0 –.5 –.9 –1.1 –1.3 –1.6 –1.6 –1.1 –.7 –.7 –.9 –1.5 –1.8 –2.0 –1.9 –2.1 –1.8 –1.5 .1 .2 .0

ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
AUGUST 1999 : AMSUA-5 channel (700 hPa)
NOAA-15, USING ALL OBSERVATIONS

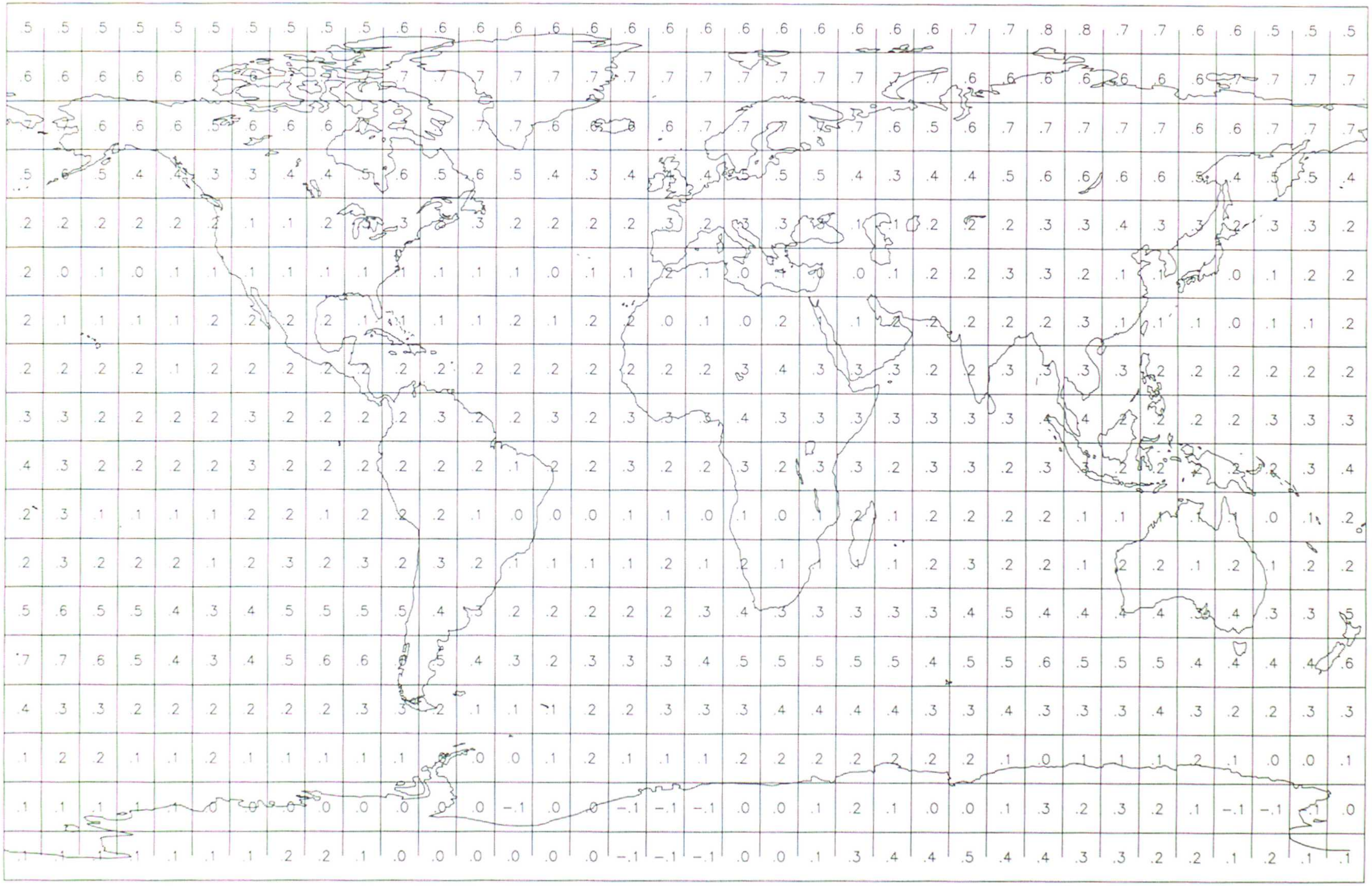
FIGURE 35



.3	.3	.3	.3	.3	.4	.4	.3	.6	.8	.9	.7	.7	1.0	.9	.8	.4	.3	.4	.6	.6	.4	.5	.5	.4	.4	.4	.4	.3	.3	.4	.4	.4	.4	.4	.3
.5	.5	.5	.5	.5	.5	.6	.6		.9	.8	.8	1.2	1.5	1.4	1.1	.6	.8	.6	.7	.7	.4	.4	.6	.6	.7	.7	.7	.7	.6	.6	.6	.6	.5	.4	.5
.7	.7	.6	1.0	.9	.8	.8	.9	.9	[illegible]	.7	.8	.7	1.9	1.5	.7	.8	.8	.7	.7	.6	.6	.7	.6	.7	.7	.6	.6	.6	.6	.6	.8	.9	.8	1.0	.9
.6	.7	.7	.5	.8	.9	.8	.9	.8	.7	.6	.6	.6	.6	.5	.5	.5		.7	.8	.9	.7	.7	.8	.8	.8	1.0	1.0	.9	.7	.7	.8	.8	.7	.8	.7
.7	.6	.5	.5	.4	.9	1.2	1.5	1.1	.9	.7	.8	.7	.6	.6	.5	.5	.8	1.0	.9	1.1	1.1	1.0	.9	.9	1.7	1.8	1.6	1.1	.8	.8	.8	.8	.6	.7	.7
.5	.4	.4	.4	.4	.6	1.3	1.7	1.2	.9	.9	.8	.7	.4	.4	.5	.4	1.2	.9	.7	.9	1.0	1.3	1.6	1.4	2.8	3.2	2.9	1.2	.8	1.1	.9	.6	.6	.8	.7
.4	.4	.5	.4	.4	.4	.9	1.7	.8	.9	1.1	.7	.6	.4	.4	.4	1.1	1.1	.9	.6	1.0	1.2	1.5	1.4	1.2	.9	1.8	1.3	1.1	1.2	1.0	.8	1.0	.8	.7	.6
.8	.5	.6	.6	.7	.8	1.0	1.1	1.1	1.0	.8	.8	.7	.5	.6	.7	1.2	1.6	1.5	1.4	1.2	1.4	1.3	.8	.4	.8	1.1	1.1	.9	.9	1.2	1.2	1.0	.5	.8	.5
.8	.7	.7	.8	.6	.7	.8	.7	.8	1.0	1.1	.8	.8	.6	.9	.8	.9	.6	.8	1.0	.9	1.0	.8	.5	.6	.8	.6	1.0	1.0	1.1	1.1	1.2	1.0	.9	.7	.9
.5	.5	.4	.4	.4	.4	.4	.4	.4	.5	.8	.6	.6	.7	.7	.4	.4	.4	.4	.7	.9	1.1	.5	.6	1.0	.9	.8	.9	.9	.8	.9	1.0	1.0	1.1	.7	.4
.7	.6	.5	.6	.4	.4	.4	.4	.5	.6	1.3	1.0	.7	.7	.5	.4	.4	.4	.5	.7	.7	.6	.8	.5	.4	.4	.5	.5	.4	.4	.8	.9	.8	.8	.9	.9
.8	.5	.4	.5	.6	.6	.5	.5	.5	.5	.6	1.2	.6	.7	.5	.5	.6	.6	.5	.7	.7	.6	.7	.5	.5	.5	.6	.5	.6	.8	.7	.9	.9	.7	.7	.7
.7	.7	.7	.6	.8	.7	.8	.7	.7	.6	.8	.8	.7	.7	.7	.6	.7	.6	.6	.7	.8	.8	.9	.7	.6	.6	.7	.7	.7	.7	.7	.7	.8	.7	.5	.7
.7	.6	.5	.6	.6	.6	.6	.7	.7	.6	.8	.7	.6	.7	.7	.7	.7	.8	.7	.7	.6	.8	1.1	.9	.8	.9	.9	.8	.7	.7	.6	.6	.7	.5	.7	.7
.6	.6	.6	.7	.6	.6	.6	.7	.7	.8	.9	.8	.7	.6	.7	.8	.8	.9	.9	.9	.7	.7	.7	.9	.8	.8	.9	.7	.7	.6	.7	.7	.7	.7	.8	.7
.9	.9	.9	.8	.8	.9	.9	.9	.9	.9	1.0	[illegible]	.9	.7	.7	.7	.7	.8	.8	.8	.7	.8	1.0	1.2	1.0	1.0	1.1	1.1	1.1	1.1	1.2	1.3	1.1	.9	.8	.9
.9	.9	1.2	1.4	1.6	1.8	1.9	1.7	2.0	2.0	1.7	1.6	1.0	1.0	1.0	1.4	1.5	2.0	2.1	2.5	2.4	2.2	2.3	2.1	1.9	1.9	2.2	2.5	2.3	2.4	2.4	1.9	1.7	1.8	1.6	.9
1.1	1.0	1.2	1.5	1.3	1.3	1.5	2.1	2.1	1.2	1.1	1.1	1.3	1.4	1.4	1.7	1.8	2.0	2.1	2.2	1.9	1.9	2.1	2.3	2.6	2.9	2.9	2.8	2.6	2.3	1.9	1.7	1.6	2.0	1.7	1.2

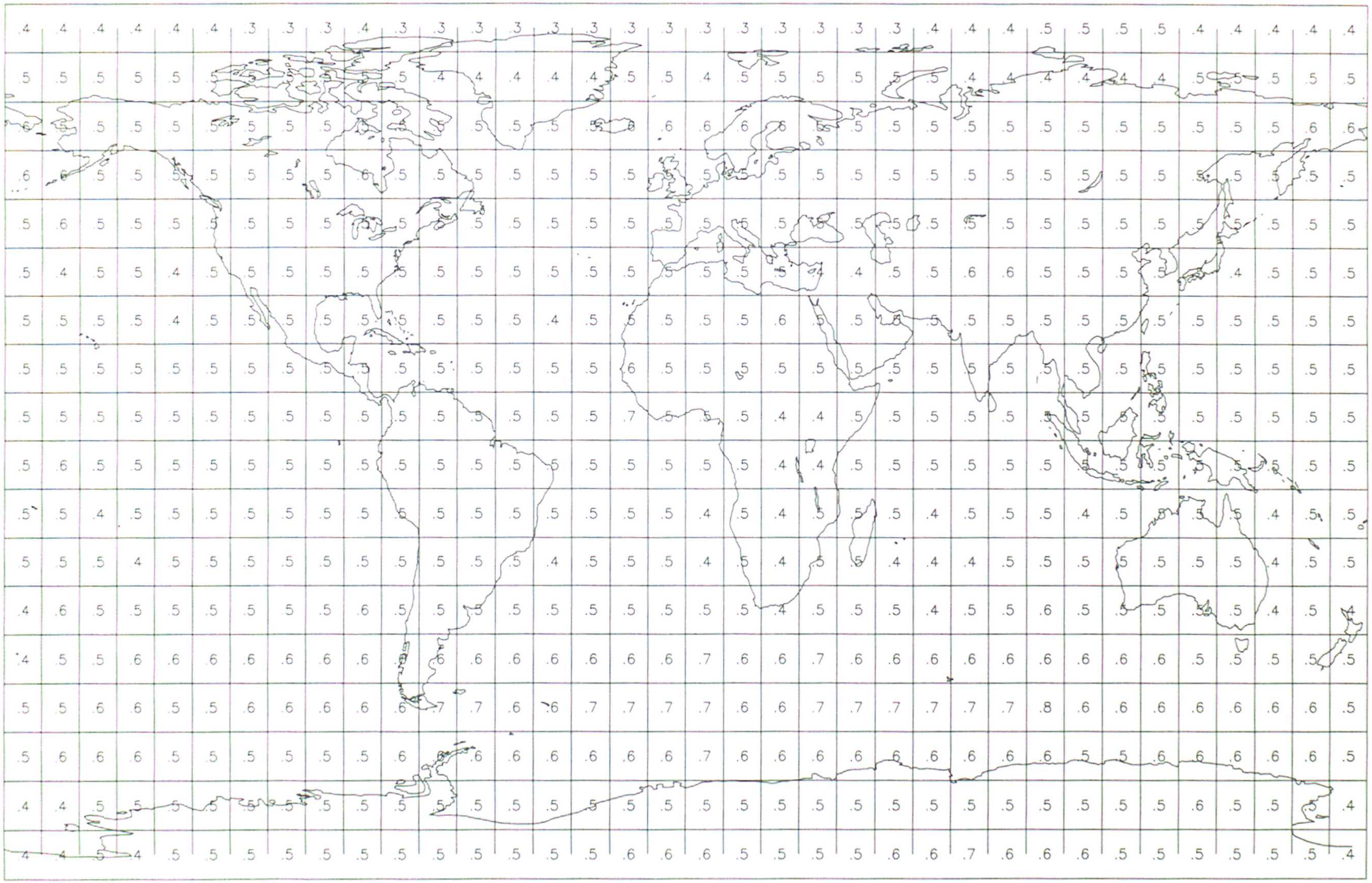
ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)
AUGUST 1999 : AMSUA-7 Channel (300 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 36



.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.7	.7	.8	.8	.7	.7	.6	.6	.5	.5	.5
.6	.6	.6	.6	.6	.6	.6	[illegible]	[illegible]	[illegible]	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.6	.6	.6	.6	.6	.6	.6	.7	.7	.7	.7
.7	.7	.6	.6	.6	.5	.6	.6	.6	[illegible]	.7	[illegible]	.7	.7	.6	.6	.6	.6	.7	.7	.7	.7	.7	.6	.5	.6	.7	.7	.7	.7	.7	.6	.6	.7	.7	.7
.5	.6	.5	.4	.4	.3	.3	.4	.4	.5	.6	.5	.6	.5	.4	.3	.4	.4	.4	.5	.5	.5	.4	.3	.4	.4	.5	.6	.6	.6	.6	.5	.4	.5	.5	.4
.2	.2	.2	.2	.2	.2	.1	.1	.2	.3	.3	[illegible]	.3	.2	.2	.2	.2	.3	.2	.3	.3	.3	.1	.1	.2	.2	.2	.3	.3	.4	.3	.3	.2	.3	.3	.2
.2	.0	.1	.0	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.0	.1	.1	.2	.1	.0	.1	.0	.0	.1	.2	.2	.3	.3	.2	.1	.1	[illegible]	.0	.1	.2	.2
.2	.1	.1	.1	.1	.2	.2	.2	.2	.1	.1	.1	.1	.2	.1	.2	.2	.0	.1	.0	.2	.1	.1	.2	.2	.2	.2	.2	.3	.1	.1	.1	.0	.1	.1	.2
.2	.2	.2	.2	.1	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.3	.4	.3	.3	.3	.2	.2	.3	.3	.3	.3	.2	.2	.2	.2	.2	.2
.3	.3	.2	.2	.2	.2	.3	.2	.2	.2	.2	.3	.2	.2	.3	.2	.3	.3	.3	.4	.3	.3	.3	.3	.3	.3	.3	.4	.4	.2	.2	.2	.2	.3	.3	.3
.4	.3	.2	.2	.2	.2	.3	.2	.2	.2	.2	.2	.2	.1	.2	.2	.3	.2	.2	.3	.2	.3	.3	.2	.3	.3	.2	.3	.3	.2	.2	.2	.2	.2	.3	.4
.2	.3	.1	.1	.1	.1	.2	.2	.1	.2	.2	.2	.1	.0	.0	.0	.1	.1	.0	.1	.0	.1	.2	.1	.2	.2	.2	.2	.1	.1	[illegible]	.1	.1	.0	.1	.2
.2	.3	.2	.2	.2	.1	.2	.3	.2	.3	.2	.3	.2	.1	.1	.1	.1	.2	.1	.2	.1	.1	.1	.1	.2	.3	.2	.2	.1	.2	.2	.1	.2	.1	.2	.2
.5	.6	.5	.5	.4	.3	.4	.5	.5	.5	.5	.4	.3	.2	.2	.2	.2	.2	.3	.4	.3	.3	.3	.3	.3	.4	.5	.4	.4	.4	.4	.3	.4	.3	.3	.5
.7	.7	.6	.5	.4	.3	.4	.5	.6	.6	.6	.5	.4	.3	.2	.3	.3	.3	.4	.5	.5	.5	.5	.5	.4	.5	.5	.6	.5	.5	.5	.4	.4	.4	.4	.6
.4	.3	.3	.2	.2	.2	.2	.2	.2	.3	.3	.2	.1	.1	.1	.2	.2	.3	.3	.3	.4	.4	.4	.4	.3	.3	.4	.3	.3	.3	.4	.3	.2	.2	.3	.3
.1	.2	.2	.1	.1	.2	.1	.1	.1	.1	.1	[illegible]	.0	.0	.1	.2	.1	.1	.1	.2	.2	.2	.2	.2	.2	.2	.1	.0	.1	.1	.1	.2	.1	.0	.0	.1
.1	.1	.1	.1	.1	.0	.0	.0	.0	.0	.0	.0	.0	-.1	.0	.0	-.1	-.1	-.1	.0	.0	.1	.2	.1	.0	.0	.1	.3	.2	.3	.2	.1	-.1	-.1	-.1	.0
.1	.1	.1	.1	.1	.1	.1	.2	.2	.1	.0	.0	.0	.0	.0	.0	-.1	-.1	-.1	.0	.0	.1	.3	.4	.4	.5	.4	.4	.3	.3	.2	.2	.1	.2	.1	.1

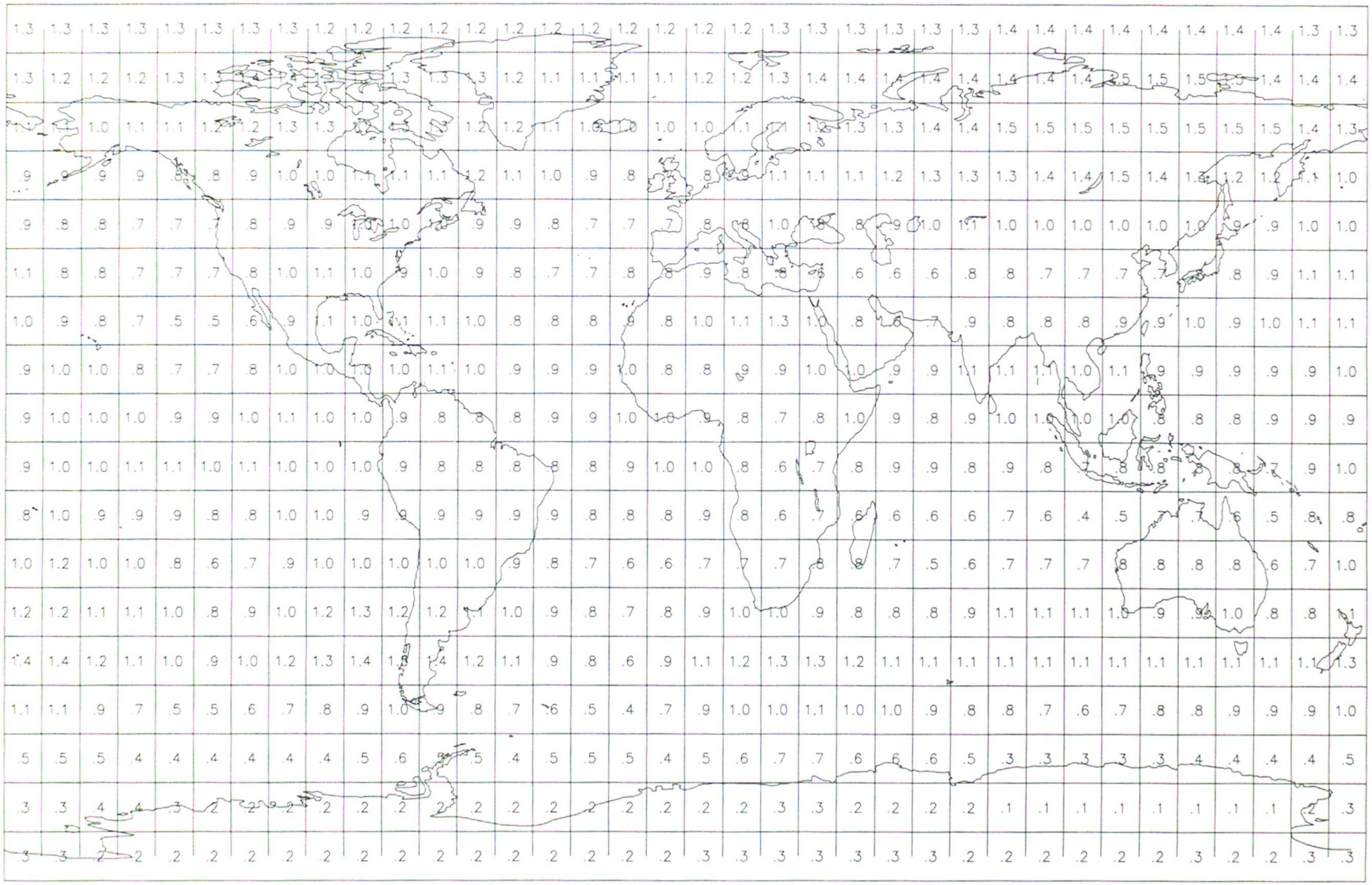
ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C) FIGURE 37
AUGUST 1999 : AMSUA-7 channel (300 hPa)
NOAA-15, USING ALL OBSERVATIONS



.4	.4	.4	.4	.4	.4	.3	.3	.3	.4	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	.4	.4	.4	.5	.5	.5	.5	.4	.4	.4	.4	.4
.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.4	.4	.4	.4	.5	.5	.4	.5	.5	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4	.5	.5	.5	.5	.5
.6	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.6	.6	.6	.6	.6	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.6	.6
.6	.6	.5	.5	.5	.5	.5	.5	.5	.6	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5
.5	.6	.5	.5	.5	.5	.5	.5	.5	.5	.5		.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5
.5	.4	.5	.5	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.4	.5	.5	.6	.6	.5	.5	.5	.5	.5	.4	.5	.5	.5
.5	.5	.5	.5	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.5	.5	.5	.5	.5	.6	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5
.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.6	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5
.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.7	.5	.5	.5	.4	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5
.5	.6	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5
.5	.5	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.5	.4	.5	.5	.5	.4	.5	.5	.5	.4	.5	.5	.5	.5	.4	.5	.5
.5	.5	.5	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.5	.5	.5	.4	.5	.4	.5	.5	.4	.4	.4	.5	.5	.5	.5	.5	.5	.5	.4	.5	.5
.4	.6	.5	.5	.5	.5	.5	.5	.5	.6	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.5	.5	.5	.4	.5	.5	.6	.5	.5	.5	.5	.5	.4	.5	.4
.4	.5	.5	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.7	.6	.6	.7	.6	.6	.6	.6	.6	.6	.6	.6	.6	.5	.5	.5	.5	.5
.5	.5	.6	.6	.5	.5	.6	.6	.6	.6	.6	.7	.7	.6	.6	.7	.7	.7	.7	.6	.6	.7	.7	.7	.7	.7	.7	.8	.6	.6	.6	.6	.6	.6	.6	.5
.5	.6	.6	.6	.5	.5	.5	.5	.5	.5	.6	.6	.6	.6	.6	.6	.6	.6	.7	.6	.6	.6	.6	.6	.6	.6	.6	.6	.5	.5	.6	.6	.6	.6	.6	.5
.4	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.6	.5	.5	.5	.4
.4	.4	.5	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.6	.6	.6	.5	.5	.5	.5	.6	.6	.7	.6	.6	.6	.5	.5	.5	.5	.5	.5	.4

ATOVS : MEAN O-B BRIGHTNESS TEMPERATURE DIFFERENCES (DEG C)
AUGUST 1999 : AMSUA-9 Channel (100 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 38



ATOVS : SD O-B BRIGHTNESS TEMPERATURE DIFFERENCES(DEG C)
AUGUST 1999 : AMSUA-9 channel (100 hPa)
NOAA-15, USING ALL OBSERVATIONS

FIGURE 39

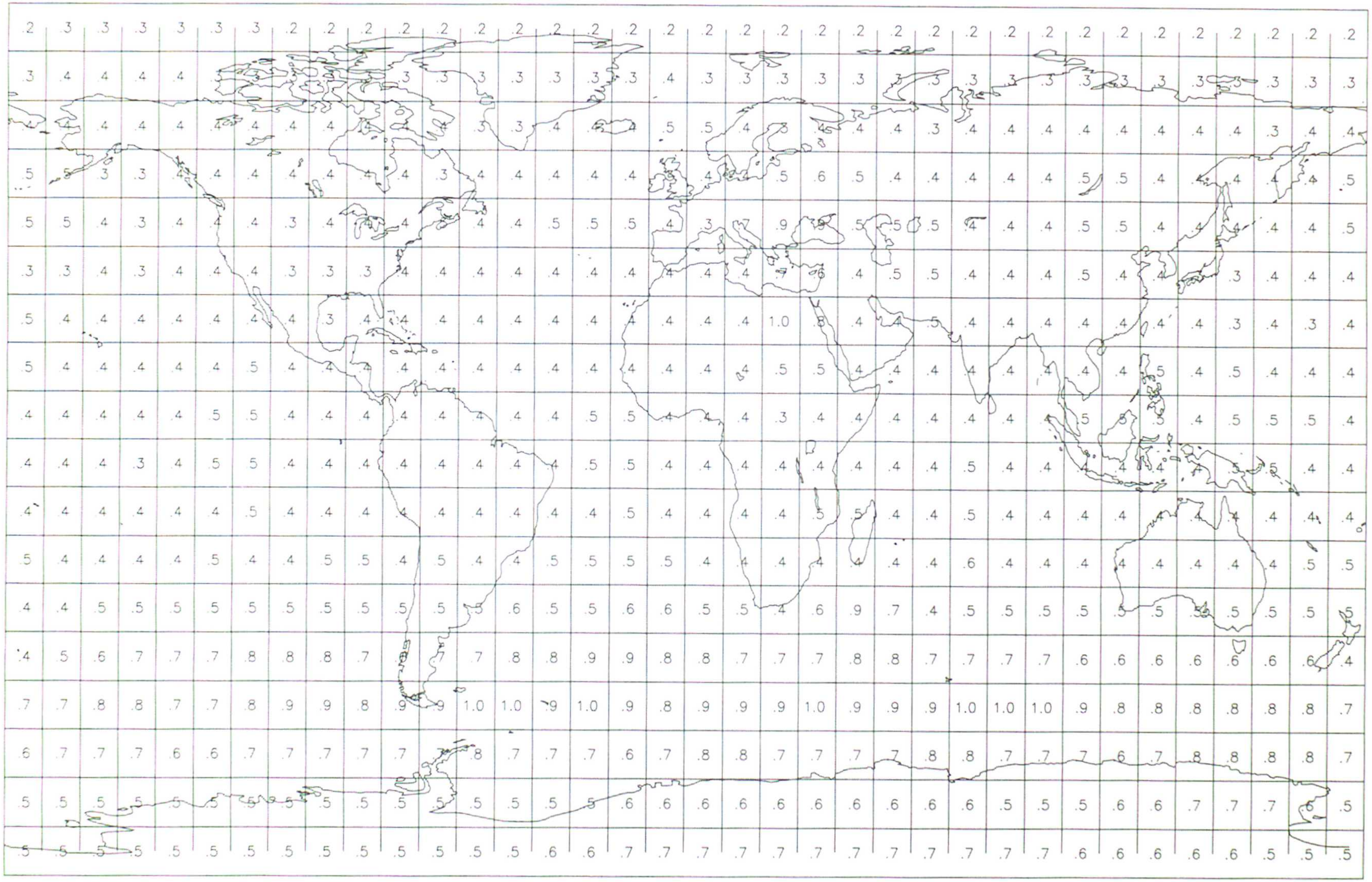

.2 .3 .3 .3 .3 .3 .3 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.3 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .4 .4 .4 .5 .5 .4 .3 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4
.5 .5 .3 .3 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .5 .6 .5 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .5
.5 .5 .4 .3 .4 .4 .4 .3 .4 .4 .4 .4 .4 .5 .5 .5 .4 .3 .7 .9 .9 .5 .5 .5 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .5
.3 .3 .4 .3 .4 .4 .4 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .7 .6 .4 .5 .5 .4 .4 .4 .5 .4 .4 .3 .4 .4 .4
.5 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 1.0 .8 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .3 .4 .3 .4
.5 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .5 .4 .4 .4
.4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .4 .5 .5 .5 .4
.4 .4 .4 .3 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4
.4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .4 .5 .5 .4 .4 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.5 .4 .4 .4 .4 .5 .4 .4 .5 .5 .4 .5 .4 .4 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .6 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5
.4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .6 .6 .5 .5 .4 .6 .9 .7 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.4 .5 .6 .7 .7 .7 .8 .8 .8 .7 .8 .7 .7 .8 .8 .9 .9 .8 .8 .7 .7 .7 .8 .8 .7 .7 .7 .7 .6 .6 .6 .6 .6 .6 .6 .4
.7 .7 .8 .8 .7 .7 .8 .9 .9 .8 .9 .9 1.0 1.0 .9 1.0 .9 .8 .9 .9 .9 1.0 .9 .9 .9 1.0 1.0 1.0 .9 .8 .8 .8 .8 .8 .8 .7
.6 .7 .7 .7 .6 .6 .7 .7 .7 .7 .7 .7 .8 .7 .7 .7 .6 .7 .8 .8 .7 .7 .7 .7 .8 .8 .7 .7 .7 .6 .7 .8 .8 .8 .8 .7
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .5 .5 .5 .6 .6 .7 .7 .7 .6 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .6 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .6 .6 .6 .6 .6 .5 .5 .5

TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: August 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoy.

Area monitored :10°N - 80°N, 85°W - 0°W

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :All hours combined.

Elements monitored :Mean sea-level pressure (hPa)
:Wind speed ($m\ s^{-1}$)
:Wind direction (degrees)

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. A positive bias indicates the observation is veered to the background

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors

GROSS ERROR LIMITS :15 hPa (pressure)
:25 $m\ s^{-1}$ (Vector Wind)

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 $m\ s^{-1}$

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
13504	25.4	-20.5	ALL	P	SUR	166	0	0	0.7	-0.1	0.7
13505	20.0	-20.6	ALL	P	SUR	162	0	0	0.8	0.2	0.8
13506	13.1	-18.6	ALL	P	SUR	148	0	0	1.1	-0.3	1.2
41502	25.1	-47.0	ALL	P	SUR	11	0	0	0.7	0.3	0.7
41503	20.3	-49.3	ALL	P	SUR	142	0	0	0.8	0.0	0.8
41504	26.1	-75.9	ALL	P	SUR	226	0	0	0.8	0.3	0.8
41505	33.1	-55.6	ALL	P	SUR	298	0	0	1.5	0.0	1.5
41520	20.4	-47.5	ALL	P	SUR	272	0	0	0.8	-0.3	0.9
41521	26.4	-58.7	ALL	P	SUR	287	0	0	0.6	0.1	0.6
41524	12.4	-58.2	ALL	P	SUR	245	0	0	0.7	-0.1	0.7
41525	14.6	-51.1	ALL	P	SUR	262	0	0	0.7	0.2	0.7
41528	28.5	-75.6	ALL	P	SUR	285	2	1	1.4	0.4	1.5
41598	23.8	-47.3	ALL	P	SUR	74	1	1	0.7	0.4	0.9
41599	29.2	-37.9	ALL	P	SUR	606	7	1	0.7	-0.1	0.7
41625	28.5	-74.4	ALL	P	SUR	271	0	0	0.8	0.5	1.0
41626	16.2	-51.8	ALL	P	SUR	268	0	0	0.6	0.1	0.6
41627	15.2	-55.0	ALL	P	SUR	268	0	0	0.7	-0.2	0.7
41628	25.1	-56.2	ALL	P	SUR	297	0	0	0.9	0.7	1.1
41630	20.4	-40.5	ALL	P	SUR	272	0	0	0.8	0.2	0.9
41636	27.0	-55.9	ALL	P	SUR	599	5	1	0.8	0.5	1.0
41637	26.8	-46.6	ALL	P	SUR	249	2	1	0.7	0.5	0.8
41638	25.0	-51.9	ALL	P	SUR	589	1	0	1.0	0.2	1.0
41640	13.1	-54.0	ALL	P	SUR	271	0	0	0.8	0.3	0.8
41641	14.9	-48.8	ALL	P	SUR	242	0	0	0.8	0.4	0.9
41643	22.0	-52.5	ALL	P	SUR	284	0	0	0.6	0.1	0.7
41644	17.6	-47.5	ALL	P	SUR	276	0	0	0.8	0.1	0.8
41645	21.9	-44.9	ALL	P	SUR	280	0	0	0.7	-0.3	0.7
41648	40.6	-47.9	ALL	P	SUR	294	0	0	1.1	0.1	1.1
41649	27.3	-71.3	ALL	P	SUR	253	0	0	0.7	0.5	0.8
41650	25.7	-71.8	ALL	P	SUR	269	0	0	1.1	0.3	1.1
41651	25.6	-71.6	ALL	P	SUR	275	0	0	0.9	0.5	1.0
41652	23.2	-68.3	ALL	P	SUR	250	0	0	1.0	0.0	1.0
41653	22.4	-69.4	ALL	P	SUR	261	0	0	0.8	0.0	0.8
41654	16.7	-58.6	ALL	P	SUR	185	0	0	0.6	0.6	0.8
41655	15.1	-68.5	ALL	P	SUR	191	51	27	4.0	-6.8	7.9
41656	27.7	-70.7	ALL	P	SUR	630	0	0	0.8	1.0	1.2
41657	26.5	-70.0	ALL	P	SUR	743	0	0	0.8	0.7	1.1
41658	26.5	-71.8	ALL	P	SUR	223	0	0	0.6	1.1	1.3
41659	23.3	-70.2	ALL	P	SUR	537	0	0	0.8	1.4	1.6
41660	22.2	-70.2	ALL	P	SUR	498	0	0	0.8	1.8	2.0
41661	16.0	-65.6	ALL	P	SUR	293	0	0	0.8	0.4	0.9
41662	13.8	-69.2	ALL	P	SUR	445	0	0	0.9	0.7	1.2
41852	28.1	-79.5	ALL	P	SUR	35	0	0	1.6	2.5	3.0
41853	28.4	-75.8	ALL	P	SUR	59	0	0	1.8	2.2	2.8
437868	42.5	-19.5	ALL	P	SUR	1	0	0	0.0	1.6	1.6
44546	44.1	-35.7	ALL	P	SUR	1981	0	0	0.8	-0.2	0.8
44607	53.6	-42.4	ALL	P	SUR	678	0	0	1.1	-0.4	1.2
44608	45.7	-25.1	ALL	P	SUR	1848	0	0	0.8	-0.2	0.8
44610	56.0	-37.0	ALL	P	SUR	1991	1	0	1.2	0.0	1.2
44613	33.7	-19.6	ALL	P	SUR	1034	5	0	0.6	-0.2	0.6
44614	52.2	-47.1	ALL	P	SUR	823	5	1	1.2	-0.8	1.5
44616	58.0	-19.7	ALL	P	SUR	1872	13	1	0.9	-0.1	1.0
44621	49.3	-29.3	ALL	P	SUR	953	5	1	1.2	-0.5	1.3
44624	57.3	-20.6	ALL	P	SUR	1824	5	0	1.0	-0.3	1.0
44625	51.3	-33.5	ALL	P	SUR	1810	9	0	1.2	-0.2	1.2
44626	47.1	-43.1	ALL	P	SUR	1283	1	0	1.2	-0.3	1.2
44627	42.9	-55.4	ALL	P	SUR	1175	4	0	1.2	-0.4	1.3
44628	40.6	-45.1	ALL	P	SUR	1125	3	0	1.1	0.1	1.1
44629	42.2	-44.4	ALL	P	SUR	912	8	1	3.4	3.4	4.8
44630	43.4	-46.9	ALL	P	SUR	1169	1	0	1.0	-0.2	1.0

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
44728	52.6	-15.4	ALL	P	SUR	1120	7	1	1.4	-0.4	1.4
44742	43.7	-5.1	ALL	P	SUR	1142	3	0	1.1	0.6	1.3
44764	51.4	-0.7	ALL	P	SUR	177	1	1	2.5	-8.4	8.8
44765	30.8	-48.8	ALL	P	SUR	541	5	1	1.4	-0.1	1.4
44766	55.5	-39.9	ALL	P	SUR	1318	11	1	1.6	-0.5	1.6
44773	59.3	-30.4	ALL	P	SUR	1868	8	0	1.2	-0.4	1.3
44777	61.7	-41.0	ALL	P	SUR	2001	9	0	1.4	-0.5	1.5
44778	47.6	-7.1	ALL	P	SUR	1222	3	0	1.0	-0.1	1.0
61532	47.8	-3.5	ALL	P	SUR	9	9	100			
62505	45.1	-12.0	ALL	P	SUR	640	1	0	1.3	-0.4	1.4
62506	42.7	-18.5	ALL	P	SUR	658	4	1	3.7	-1.0	3.8
62520	34.0	-22.5	ALL	P	SUR	996	2	0	0.7	-0.5	0.8
62554	35.2	-13.7	ALL	P	SUR	973	4	0	0.6	0.1	0.7
62701	50.6	-2.7	ALL	P	SUR	1	0	0	0.0	-0.3	0.3
62825	53.8	-3.6	ALL	P	SUR	1	0	0	0.0	0.9	0.9
62901	49.5	-7.1	ALL	P	SUR	250	0	0	0.8	0.3	0.8
64516	64.2	-38.8	ALL	P	SUR	2679	0	0	1.2	-0.5	1.3
64517	61.7	-56.9	ALL	P	SUR	2139	0	0	1.4	-0.4	1.5
64518	58.2	-45.5	ALL	P	SUR	2078	1	0	1.3	-0.9	1.5
64529	62.9	-5.9	ALL	P	SUR	1236	6	0	1.0	-0.5	1.1
64530	61.2	-35.8	ALL	P	SUR	1060	8	1	1.2	-0.6	1.3
64692	65.8	-25.0	ALL	P	SUR	100	0	0	0.8	-0.5	0.9
64693	66.4	-20.7	ALL	P	SUR	1093	0	0	0.8	-0.4	0.9
64694	66.1	-19.3	ALL	P	SUR	1094	0	0	0.9	-1.2	1.5
64695	66.7	-22.8	ALL	P	SUR	1226	0	0	0.9	-0.2	0.9
64698	66.7	-24.0	ALL	P	SUR	1579	0	0	0.9	-0.4	1.0
64699	65.7	-34.2	ALL	P	SUR	1413	5	0	1.7	-0.2	1.7
64700	65.1	-26.6	ALL	P	SUR	1328	3	0	1.5	-0.1	1.5
65593	60.9	-20.0	ALL	P	SUR	1134	2	0	1.0	-0.4	1.1
65594	62.9	-29.6	ALL	P	SUR	1300	5	0	1.2	-0.3	1.2
65595	58.8	-38.6	ALL	P	SUR	1499	120	8	1.3	-0.7	1.5
65599	63.6	-31.9	ALL	P	SUR	2032	11	1	1.0	-0.1	1.0
99908	44.0	-43.9	ALL	P	SUR	1	0	0	0.0	0.3	0.3
WIND SPEED											
03718	48.3	-61.5	ALL	SPEED	SUR	1	0	0	0.0	-2.8	2.8
41503	20.3	-49.3	ALL	SPEED	SUR	136	0	0	2.1	0.0	2.1
41504	26.1	-75.9	ALL	SPEED	SUR	15	0	0	3.0	-7.9	8.4
41520	20.4	-47.5	ALL	SPEED	SUR	268	0	0	2.2	0.3	2.2
41521	26.4	-58.7	ALL	SPEED	SUR	242	0	0	1.3	-0.7	1.5
41524	12.4	-58.2	ALL	SPEED	SUR	240	0	0	3.8	2.0	4.3
41625	28.5	-74.4	ALL	SPEED	SUR	253	0	0	1.3	-0.5	1.4
41630	20.4	-40.5	ALL	SPEED	SUR	266	0	0	1.5	-0.3	1.5
41636	27.0	-55.9	ALL	SPEED	SUR	295	0	0	1.3	-1.9	2.3
41638	25.0	-51.9	ALL	SPEED	SUR	355	0	0	1.8	-0.6	1.9
41640	13.1	-54.0	ALL	SPEED	SUR	268	0	0	2.7	1.2	2.9
41641	14.9	-48.8	ALL	SPEED	SUR	241	0	0	2.2	-0.5	2.2
41644	17.6	-47.5	ALL	SPEED	SUR	216	0	0	6.5	0.5	6.5
41649	27.3	-71.3	ALL	SPEED	SUR	244	0	0	1.9	0.0	1.9
41650	25.7	-71.8	ALL	SPEED	SUR	263	0	0	3.3	1.8	3.7
41651	25.6	-71.6	ALL	SPEED	SUR	269	0	0	3.0	1.6	3.4
41652	23.2	-68.3	ALL	SPEED	SUR	245	0	0	3.0	0.8	3.2
41653	22.4	-69.4	ALL	SPEED	SUR	256	0	0	2.6	0.3	2.6
41654	16.7	-58.6	ALL	SPEED	SUR	6	0	0	5.6	3.1	6.4
41655	15.1	-68.5	ALL	SPEED	SUR	166	0	0	7.5	3.3	8.2
437868	42.5	-19.5	ALL	SPEED	SUR	1	0	0	0.0	3.5	3.5
44607	53.6	-42.4	ALL	SPEED	SUR	665	0	0	2.4	1.0	2.6
44773	59.3	-30.4	ALL	SPEED	SUR	1259	0	0	2.5	-0.3	2.6
44777	61.7	-41.0	ALL	SPEED	SUR	1405	0	0	2.5	-0.1	2.5
62505	45.1	-12.0	ALL	SPEED	SUR	623	0	0	1.7	0.3	1.7

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
WIND SPEED											
62506	42.7	-18.5	ALL	SPEED	SUR	650	0	0	1.9	0.5	2.0
62581	51.0	-13.3	ALL	SPEED	SUR	1	0	0	0.0	0.5	0.5
65599	63.6	-31.9	ALL	SPEED	SUR	1505	0	0	2.1	0.2	2.1
99908	44.0	-43.9	ALL	SPEED	SUR	1	0	0	0.0	4.1	4.1
WIND DIRECTION											
41503	20.3	-49.3	ALL	DIRN.	SUR	96	0	0	19.1	4.4	19.6
41520	20.4	-47.5	ALL	DIRN.	SUR	190	0	0	15.6	19.3	24.8
41521	26.4	-58.7	ALL	DIRN.	SUR	131	0	0	12.8	-6.3	14.2
41524	12.4	-58.2	ALL	DIRN.	SUR	89	0	0	17.1	-5.8	18.1
41625	28.5	-74.4	ALL	DIRN.	SUR	118	0	0	18.0	8.0	19.7
41630	20.4	-40.5	ALL	DIRN.	SUR	208	0	0	13.9	15.5	20.9
41636	27.0	-55.9	ALL	DIRN.	SUR	2	0	0	16.0	-74.2	76.0
41638	25.0	-51.9	ALL	DIRN.	SUR	246	0	0	30.9	61.1	68.5
41640	13.1	-54.0	ALL	DIRN.	SUR	151	0	0	21.5	0.2	21.5
41641	14.9	-48.8	ALL	DIRN.	SUR	86	0	0	21.7	32.6	39.2
41644	17.6	-47.5	ALL	DIRN.	SUR	101	0	0	18.8	11.2	21.8
41649	27.3	-71.3	ALL	DIRN.	SUR	112	0	0	17.4	6.8	18.7
41650	25.7	-71.8	ALL	DIRN.	SUR	105	0	0	29.3	23.6	37.6
41651	25.6	-71.6	ALL	DIRN.	SUR	122	0	0	20.3	33.8	39.5
41652	23.2	-68.3	ALL	DIRN.	SUR	172	0	0	26.4	-4.3	26.8
41653	22.4	-69.4	ALL	DIRN.	SUR	164	0	0	21.2	24.5	32.4
41654	16.7	-58.6	ALL	DIRN.	SUR	5	0	0	23.8	43.2	49.3
41655	15.1	-68.5	ALL	DIRN.	SUR	125	0	0	16.4	20.1	25.9
44607	53.6	-42.4	ALL	DIRN.	SUR	449	0	0	21.5	1.5	21.6
44773	59.3	-30.4	ALL	DIRN.	SUR	696	0	0	17.1	-1.8	17.2
44777	61.7	-41.0	ALL	DIRN.	SUR	599	0	0	15.8	-6.5	17.1
62505	45.1	-12.0	ALL	DIRN.	SUR	428	0	0	17.8	-17.3	24.8
62506	42.7	-18.5	ALL	DIRN.	SUR	428	0	0	17.7	-1.8	17.8
65599	63.6	-31.9	ALL	DIRN.	SUR	690	0	0	16.2	1.1	16.2

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: August 1999

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:40°N - 70°N, 60°W - 0°W.
Standard of comparison		:Background field from UKMO global model.
Observation times		:All hours combined.
Level(s) monitored		:300.0 - 150.0 hPa
Elements monitored		:TEMP in °C ; WIND in m s^{-1}
Parameters monitored	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.
GROSS ERROR LIMITS	:10.0 °C ; 60 m s^{-1} Vector Wind	
SELECTION CRITERIA	:N REP $\geq$ 20	

NB: US ACARs and ADS data are shown at the bottom of the table as US ACAR and ADS respectively.

	TEMPERATURE					WIND				
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	3232	0	6	1.7	0.0	3238	0	7	0	7.9	0.9
ACA	1947	0	4	1.9	-0.3	1971	0	4	0	7.1	1.0
ADB	30	0	23	1.7	-1.0	32	0	28	0	10.8	4.9
AEA	247	2	6	2.0	0.4	241	0	5	0	7.8	1.8
AEL	630	0	21	2.0	0.0	664	0	21	0	7.4	0.5
AFL	364	1	5	2.1	0.5	363	0	7	0	7.8	0.9
AFR	1249	1	11	1.7	0.1	1281	0	12	0	8.0	0.8
AIH	285	1	3	1.8	0.2	287	0	3	0	6.6	0.7
AJM	76	0	7	1.2	-0.3	78	0	8	0	8.0	0.6
AMM	76	0	3	1.4	0.2	77	0	4	0	6.5	0.4
AMT	44	9	20	1.7	0.8	45	0	11	0	7.2	2.1
AMX	222	2	5	1.6	0.0	228	0	8	0	11.6	1.5
ANZ	184	0	4	2.2	-1.0	180	0	3	0	5.4	0.5
AOM	433	2	9	1.9	0.9	456	0	7	0	7.8	0.5
AVA	348	0	5	2.2	0.3	353	0	6	0	9.0	0.7
AVE	31	0	6	1.6	0.9	30	0	13	0	13.6	1.4
AZA	567	1	8	2.4	0.8	594	0	9	0	8.9	1.1
BAL	202	0	20	1.4	-0.4	211	0	21	0	6.7	-0.1
BAW	1541	0	10	2.0	-0.3	1562	0	10	0	7.5	1.0
BLX	34	0	6	1.4	-0.3	36	0	8	0	7.0	2.0
BWA	70	1	6	1.9	1.0	74	0	7	0	9.7	0.1
CDN	890	0	5	1.8	0.4	899	0	7	0	9.0	0.9
CFG	520	0	4	1.7	-0.5	523	0	4	0	7.5	0.5
CKT	102	0	4	1.5	1.0	109	0	8	0	9.2	0.4
CLX	423	0	5	2.0	-0.3	432	0	7	0	8.3	0.8
CMM	667	1	3	1.7	-0.1	671	0	3	0	6.3	1.0
COA	925	1	5	1.6	0.1	940	0	11	0	12.6	2.3
CRL	396	0	3	1.8	0.4	407	0	4	0	8.0	0.5
CSA	28	4	14	3.2	-1.5	29	0	7	0	8.8	0.6
CTB	144	1	2	1.9	-0.5	147	0	0	0	5.6	0.7
CUB	290	5	12	2.1	0.9	296	0	7	0	8.1	0.5
DAL	2071	0	14	1.7	-0.4	2108	0	14	0	8.2	0.6
DBY	408	0	2	1.4	-0.3	425	0	4	0	7.9	0.8
DLH	2332	0	9	1.9	-0.1	2329	0	9	0	7.6	0.9
EEZ	42	0	10	1.1	0.2	44	2	16	0	8.3	2.7
EIN	29	0	3	2.5	-0.5	29	0	0	0	7.5	1.4
ELY	169	1	5	1.7	-0.1	176	0	3	0	7.2	1.3
ETH	21	0	29	2.2	0.5	23	0	26	0	6.8	1.2
EWW	85	0	9	1.4	0.3	89	0	11	0	11.2	1.4
FDX	688	0	7	1.5	0.3	701	0	10	0	9.0	0.8
FIN	521	0	4	2.0	0.5	518	0	5	0	8.2	0.7
GAF	40	3	8	1.8	-0.8	40	0	10	0	7.0	2.0
GCO	49	10	27	2.6	1.1	53	0	32	0	18.6	4.6
GRL	68	0	0	1.3	-0.4	69	0	1	0	7.4	1.5
HLF	75	0	8	1.2	-0.3	73	0	8	0	6.9	1.0
IBE	1509	0	24	1.9	0.6	1527	0	25	0	8.5	0.9
ICE	1177	0	2	1.7	0.0	1173	0	3	0	6.7	0.9
IWD	75	0	7	1.0	-0.3	78	0	13	0	9.8	-0.8
JKK	155	1	8	1.2	0.3	152	0	9	0	8.5	1.2
KLM	2032	0	8	1.6	0.2	2046	0	9	0	8.3	1.0
LDA	83	0	18	1.5	-0.1	83	0	23	0	12.1	-0.4
LDI	405	0	17	1.6	-0.5	421	0	15	0	7.3	0.3
LGL	30	0	13	2.2	-1.3	32	0	16	0	6.9	2.6
LIB	133	1	3	1.7	1.0	140	0	6	0	9.8	0.3
LOT	382	0	6	2.1	-1.3	382	0	6	0	8.3	0.2
LTU	446	0	9	1.4	-0.3	454	0	8	0	7.5	0.7
LXR	31	0	10	1.6	1.0	31	0	16	0	10.1	2.6
MAH	25	0	12	3.1	-1.9	26	0	8	0	9.8	2.1
MAS	86	0	8	1.8	0.3	90	0	11	0	9.1	1.3

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
MON	206	0	4	2.0	-0.1	209	0	6	0	9.7	1.2
MPD	144	0	3	2.0	0.7	146	0	9	0	10.7	-0.3
MPH	591	1	5	1.8	-0.4	595	0	5	0	7.8	0.5
NCA	22	0	0	1.9	-0.2	20	0	0	0	5.1	1.5
NWA	3730	0	3	1.9	0.6	3559	0	2	0	8.0	0.9
OAL	27	4	7	3.3	2.1	25	0	4	0	6.2	2.0
PAC	71	0	8	2.1	0.9	73	0	7	0	8.0	1.5
RAM	93	0	5	1.7	0.0	94	1	6	0	8.0	-1.0
RCH	107	0	6	1.8	0.9	114	1	16	0	14.4	3.4
RJA	44	7	14	1.6	-0.4	46	0	15	0	10.2	1.3
ROY	337	0	4	1.7	-0.3	342	0	4	0	8.3	1.0
RRR	136	1	11	1.8	0.0	135	0	10	0	6.6	1.4
SAB	31	3	6	2.7	0.0	34	0	3	0	6.3	0.4
SAS	1762	0	1	1.8	-0.3	1745	0	2	0	7.0	0.7
SBE	20	5	15	1.3	0.0	20	0	10	0	5.8	0.6
SIA	150	0	4	1.9	-1.2	148	0	5	0	6.3	0.0
SLR	162	1	100	1.9	-1.2	168	1	18	0	9.1	1.0
SVA	124	2	7	1.9	-0.4	126	0	4	0	6.9	0.3
SWR	97	2	3	1.9	-0.2	99	0	2	0	6.6	1.7
TAP	416	1	8	1.5	-0.1	418	0	7	0	8.4	1.0
TOW	227	0	7	1.8	0.1	235	0	9	0	8.6	0.6
TSC	334	1	4	2.1	0.9	337	0	6	0	8.8	1.1
TWA	1191	0	7	1.6	0.0	1109	0	7	0	7.7	1.2
UAL	2247	0	4	1.9	-0.2	2258	0	5	0	7.1	0.8
UPS	729	0	19	1.7	0.2	749	0	21	0	8.6	0.8
USA	352	1	5	1.7	-0.1	288	0	4	0	7.0	1.0
VIR	510	1	4	2.1	-0.4	518	0	5	0	8.8	1.2
VKG	30	0	0	2.3	0.7	30	0	0	0	7.2	1.6
WOA	43	0	9	2.3	0.9	44	0	7	0	5.6	0.5
BA	8422	0	1	1.5	0.2	8416	0	1	0	6.1	1.0
IT	62	0	69	1.3	-0.4	60	0	68	0	7.1	-0.9
KL	3567	0	0	1.7	0.8	3564	0	0	0	6.4	1.0
LH	575	0	0	1.8	1.0	574	0	0	0	4.8	0.4
N	326	0	3	2.1	0.7	335	0	5	0	8.6	1.2
ACARS	15163	0	2	1.5	0.5	15851	0	2	0	6.8	0.6

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: August 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DBBH	00	Z	100	15	0	12.2	15.6	9.8
DBBH	12	Z	100	15	0	13.7	20.2	14.9
DBLK	00	Z	100	1	0	0.0	12.0	12.0
DBLK	12	Z	100	13	0	28.0	39.6	28.1
ELML7	00	Z	100	16	0	16.0	25.5	19.9
ELML7	12	Z	100	18	0	15.1	29.2	25.0
FNFP	00	Z	100	1	0	0.0	31.0	31.0
FNOR	00	Z	100	12	1	13.8	20.8	15.6
FNOR	12	Z	100	14	0	19.6	19.6	-1.0
FNOU	00	Z	100	14	0	10.3	18.4	15.2
FNOU	12	Z	100	14	0	8.2	13.6	10.9
FNPH	00	Z	100	13	0	8.2	12.3	9.2
FNPH	12	Z	100	12	1	11.6	12.6	4.9
FNRS	00	Z	100	12	0	13.7	18.5	12.4
FNRS	12	Z	100	10	0	10.3	10.3	-0.9
JBOA	00	Z	100	1	0	0.0	13.0	-13.0
JCCX	00	Z	100	1	0	0.0	9.0	9.0
JIVB	00	Z	100	1	0	0.0	21.0	21.0
LDWR	00	Z	100	30	0	10.8	17.5	13.7
LDWR	12	Z	100	26	0	8.8	12.5	8.9
OVYA2	00	Z	100	11	0	13.7	14.5	-4.6
OVYA2	12	Z	100	11	0	21.2	22.2	6.6
OXYH2	00	Z	100	17	0	11.9	17.5	12.8
OXYH2	12	Z	100	14	0	13.1	14.8	6.8
UCKZ	00	Z	100	4	0	19.5	28.8	21.3
VNAA	00	Z	100	1	0	0.0	2.0	2.0
V2XM	00	Z	100	2	0	10.5	21.3	18.5
V2XM	12	Z	100	3	0	16.8	16.9	1.7
XXBA	12	Z	100	1	0	0.0	48.0	48.0
ZCBP6	00	Z	100	7	0	26.9	35.1	22.6
ZCBP6	12	Z	100	8	0	29.1	29.2	3.0
ZDLP	00	Z	100	26	0	12.7	14.4	6.9
ZDLP	12	Z	100	25	0	10.6	12.0	5.6
03953	00	Z	100	29	0	11.6	25.3	22.5
03953	12	Z	100	28	0	17.9	22.8	14.1
04018	00	Z	100	29	0	11.7	25.8	22.9
04018	12	Z	100	31	0	9.7	18.3	15.5
04220	00	Z	100	9	0	9.3	15.7	12.7
04220	12	Z	100	5	0	6.8	22.6	21.6
04270	00	Z	100	29	1	14.3	16.0	7.3
04270	12	Z	100	29	0	11.0	14.1	8.9
04339	00	Z	100	27	0	9.0	15.6	12.7
04339	12	Z	100	27	0	9.3	15.8	12.8
04360	00	Z	100	30	0	11.1	17.1	13.0
04360	12	Z	100	30	0	8.4	13.2	10.1
08001	00	Z	100	13	0	10.1	10.3	1.8
08001	12	Z	100	20	1	8.8	11.5	-7.4
08508	00	Z	100	1	0	0.0	8.0	-8.0
08508	12	Z	100	13	0	10.2	10.3	-1.5
08522	00	Z	100	1	0	0.0	11.0	-11.0
08522	12	Z	100	28	0	12.8	12.8	-0.4
08594	00	Z	100	15	0	19.6	26.7	18.2
08594	12	Z	100	21	0	15.8	16.0	-2.2
60020	00	Z	100	3	0	11.1	28.9	26.7
60020	12	Z	100	4	0	13.4	13.8	-3.3
71600	00	Z	100	30	0	8.9	10.4	-5.3
71600	12	Z	100	31	0	10.8	16.9	-13.0
72201	00	Z	100	29	0	15.8	35.6	31.9
72201	12	Z	100	30	0	13.7	35.4	32.6
72402	00	Z	100	27	0	33.9	44.7	29.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
72402	12	Z	100	30	0	31.6	55.1	45.1
74494	00	Z	100	28	0	7.7	15.4	13.3
74494	12	Z	100	30	0	11.0	11.5	-3.1
78016	00	Z	100	28	0	11.8	24.1	21.0
78016	12	Z	100	31	0	10.4	16.2	12.4

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: August 1999

Monitoring procedures:

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :500 hPa.

Element monitored :GEOPOTENTIAL HEIGHT in metres

Parameters monitored :NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:SD :SD of difference of observations from background values at level shown excluding those with gross errors.

:BIAS :Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DBBH	00	Z	500	16	0	8.3	11.1	7.3
DBBH	12	Z	500	19	0	12.1	12.9	4.5
DBLK	00	Z	500	1	0	0.0	11.0	11.0
DBLK	12	Z	500	14	0	31.3	34.0	13.4
ELML7	00	Z	500	19	0	9.1	11.1	6.3
ELML7	12	Z	500	20	0	9.5	12.0	7.4
FNFP	00	Z	500	1	0	0.0	7.0	7.0
FNOR	00	Z	500	14	0	14.6	16.0	6.4
FNOR	12	Z	500	15	0	13.6	13.6	-0.3
FNOU	00	Z	500	14	0	7.9	8.5	3.0
FNOU	12	Z	500	14	0	9.1	10.7	5.6
FNPH	00	Z	500	14	0	7.6	7.7	-1.4
FNPH	12	Z	500	13	0	6.0	6.0	0.5
FNRS	00	Z	500	12	0	11.9	12.0	1.6
FNRS	12	Z	500	13	0	9.1	9.2	1.5
JBOA	00	Z	500	1	0	0.0	5.0	5.0
JCCX	00	Z	500	1	0	0.0	2.0	2.0
JIVB	00	Z	500	1	0	0.0	15.0	15.0
LDWR	00	Z	500	30	0	6.9	8.8	5.4
LDWR	12	Z	500	26	1	6.9	7.1	-1.4
OVYA2	00	Z	500	14	0	10.9	17.0	-13.1
OVYA2	12	Z	500	11	0	13.4	15.5	-7.9
OXYH2	00	Z	500	21	0	10.2	14.4	10.2
OXYH2	12	Z	500	16	0	11.5	12.5	5.1
SHIP	00	Z	500	1	0	0.0	7.0	7.0
UCKZ	00	Z	500	4	0	2.7	4.4	3.5
VNAA	00	Z	500	1	0	0.0	44.0	44.0
V2XM	00	Z	500	2	0	0.5	1.6	1.5
V2XM	12	Z	500	4	0	21.3	21.7	4.0
XXBA	12	Z	500	2	0	8.5	9.6	4.5
ZCBP6	00	Z	500	7	0	19.2	26.6	18.4
ZCBP6	12	Z	500	10	0	16.5	19.5	10.4
ZDLP	00	Z	500	26	0	10.1	10.7	3.3
ZDLP	12	Z	500	26	0	14.9	14.9	1.2
03953	00	Z	500	31	0	8.0	12.2	9.2
03953	12	Z	500	31	0	9.1	11.7	7.4
04018	00	Z	500	31	0	8.4	14.3	11.6
04018	12	Z	500	31	0	6.8	13.4	11.5
04220	00	Z	500	30	0	11.3	12.9	6.1
04220	12	Z	500	29	0	12.5	13.8	5.8
04270	00	Z	500	31	0	11.6	12.9	5.2
04270	12	Z	500	29	0	11.0	11.7	3.9
04339	00	Z	500	31	0	7.9	10.8	7.4
04339	12	Z	500	29	0	9.9	13.1	8.6
04360	00	Z	500	31	0	11.5	13.5	7.2
04360	12	Z	500	30	0	8.6	9.6	4.2
08001	00	Z	500	26	0	12.3	13.1	4.4
08001	12	Z	500	24	1	8.0	8.2	-1.7
08508	00	Z	500	1	0	0.0	3.0	3.0
08508	12	Z	500	29	0	7.1	7.1	-0.1
08522	00	Z	500	1	0	0.0	0.0	0.0
08522	12	Z	500	30	0	7.9	7.9	-1.1
08594	00	Z	500	20	0	8.3	8.6	2.3
08594	12	Z	500	22	0	11.3	11.4	-1.5
60020	00	Z	500	28	0	6.7	6.7	-0.1
60020	12	Z	500	29	0	10.0	10.9	-4.6
71600	00	Z	500	30	0	13.7	15.4	-7.2
71600	12	Z	500	31	0	7.1	9.0	-5.5
72201	00	Z	500	30	0	7.5	16.7	14.9
72201	12	Z	500	30	0	5.3	13.0	11.8

```
WMO   OBS                   NUM    NUM
 IDENT TIME ELM  LEV   OBS  GROSS     SD    RMS   BIAS

 72402  00   Z   500   29      0    13.9   14.5    4.1
 72402  12   Z   500   30      0    13.5   15.8    8.1
 74494  00   Z   500   28      0     6.7    7.7    3.7
 74494  12   Z   500   31      0    10.1   10.2    1.3
 78016  00   Z   500   28      0     9.4   18.0   15.4

 78016  12   Z   500   31      0    11.0   18.2   14.5
```

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: August 1999

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :100 hPa.

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	00	V	100	12	0	0	0.0	-0.1	-1.3
DBBH	12	V	100	12	0	0	2.8	-1.2	-0.5
DBLK	00	V	100	1	0	0	2.1	-1.9	-1.0
DBLK	12	V	100	10	0	0	2.1	-0.6	0.3
ELML7	00	V	100	16	0	0	1.8	0.8	-0.5
ELML7	12	V	100	17	0	0	3.0	1.3	0.2
FNFP	00	V	100	1	0	0	3.4	16.3	4.5
FNOR	00	V	100	13	0	0	3.4	-0.2	0.8
FNOR	12	V	100	14	0	0	3.5	0.8	-0.4
FNOU	00	V	100	14	0	0	3.4	-0.7	1.3
FNOU	12	V	100	13	0	0	4.1	0.2	-1.8
FNPH	00	V	100	12	0	0	3.3	-1.0	2.2
FNPH	12	V	100	11	0	0	2.4	1.0	-1.4
FNRS	00	V	100	11	0	0	2.6	-0.3	0.7
FNRS	12	V	100	10	0	0	2.1	0.5	-0.2
JBOA	00	V	100	1	0	0	3.6	-0.2	-1.3
JCCX	00	V	100	1	0	0	3.6	-1.4	6.2
JIVB	00	V	100	1	0	0	3.6	-3.4	-0.1
LDWR	00	V	100	30	0	0	3.6	-0.7	0.6
LDWR	12	V	100	26	0	0	1.7	-0.9	0.3
OVYA2	00	V	100	9	0	0	1.6	0.3	-0.4
OVYA2	12	V	100	11	0	0	1.6	-0.5	0.1
OXYH2	00	V	100	12	0	8	1.4	-3.4	-0.2
OXYH2	12	V	100	11	0	18	2.3	-3.9	0.8
VNAA	00	V	100	1	0	0	3.0	0.5	-2.5
V2XM	00	V	100	2	0	0	3.9	0.4	-1.9
V2XM	12	V	100	3	0	0	3.9	-1.0	1.9
ZCBP6	00	V	100	6	0	0	3.9	-0.3	-0.7
ZCBP6	12	V	100	7	0	0	3.9	-0.7	-0.9
ZDLP	00	V	100	26	0	0	3.9	-1.1	-0.4
ZDLP	12	V	100	24	0	0	1.8	-0.5	-0.7
03953	00	V	100	29	0	0	2.8	0.1	1.7
03953	12	V	100	28	0	0	2.0	-0.6	0.7
04018	00	V	100	26	0	0	1.4	-0.1	-0.4
04018	12	V	100	31	0	0	1.8	-0.8	-0.4
04220	00	V	100	5	0	0	1.3	-1.1	0.3
04220	12	V	100	4	0	0	1.3	1.6	-0.8
04270	00	V	100	29	0	0	1.3	0.4	-0.7
04270	12	V	100	25	0	0	2.5	0.0	-0.5
04339	00	V	100	23	0	4	3.1	-0.5	0.1
04339	12	V	100	27	0	0	4.1	-1.9	0.2
04360	00	V	100	28	0	0	2.6	0.0	0.3
04360	12	V	100	29	0	0	1.7	-0.1	-1.0
08001	00	V	100	11	0	0	6.3	1.7	2.5
08001	12	V	100	16	0	0	3.8	0.2	-0.3
08508	00	V	100	1	0	0	4.0	-2.3	-3.4
08508	12	V	100	9	0	0	4.0	0.8	-0.2
08594	00	V	100	16	0	0	4.0	0.2	-2.8
08594	12	V	100	25	0	0	3.6	1.7	-3.1
60020	12	V	100	3	0	0	7.8	-1.9	1.9
71600	00	V	100	30	0	0	2.8	0.1	0.9
71600	12	V	100	31	0	0	2.9	-1.5	0.7
72201	00	V	100	29	0	41	3.3	0.9	-1.0
72201	12	V	100	30	0	46	2.5	0.3	0.4
72402	00	V	100	27	0	0	2.6	-1.1	1.1
72402	12	V	100	29	0	0	2.7	-0.5	-0.4
74494	00	V	100	28	0	0	2.8	-0.4	0.9
74494	12	V	100	30	0	0	2.1	-1.0	0.2
78016	00	V	100	28	0	0	4.7	0.3	0.3
78016	12	V	100	31	0	0	3.4	-0.2	0.4

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: August 1999

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS:	Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
GROSS ERROR LIMITS	:Defined in Appendix I.2	

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DBBH	00	V	500	11	0	0	0.0	-0.9	0.0
DBBH	12	V	500	13	0	0	2.8	-0.1	0.6
DBLK	00	V	500	1	0	0	2.2	0.4	-5.3
DBLK	12	V	500	10	0	0	2.2	1.0	-1.1
ELML7	00	V	500	17	0	0	2.2	-0.2	0.0
ELML7	12	V	500	19	0	0	2.1	0.4	0.6
FNFP	00	V	500	1	0	0	3.1	5.4	3.0
FNOR	00	V	500	13	0	0	3.1	-0.8	-1.1
FNOR	12	V	500	13	0	0	3.8	0.2	0.1
FNOU	00	V	500	14	0	0	3.5	0.3	1.1
FNOU	12	V	500	12	0	0	2.7	1.8	1.5
FNPH	00	V	500	12	0	0	5.0	0.0	-0.6
FNPH	12	V	500	9	0	0	2.7	-0.5	1.7
FNRS	00	V	500	10	0	0	2.7	0.9	0.1
FNRS	12	V	500	11	0	0	2.6	-1.2	-1.2
JBOA	00	V	500	1	0	0	3.9	-0.9	-0.3
JCCX	00	V	500	1	0	0	3.9	-2.4	1.0
LDWR	00	V	500	30	0	0	3.9	-0.8	-0.9
LDWR	12	V	500	27	0	0	2.2	0.5	0.4
OVYA2	00	V	500	13	0	0	2.3	0.0	0.1
OVYA2	12	V	500	11	0	0	4.4	0.9	-0.5
OXYH2	00	V	500	20	0	15	1.2	-2.5	0.6
OXYH2	12	V	500	15	0	6	3.1	-2.5	1.6
SHIP	00	V	500	1	0	0	2.6	-0.9	0.6
VNAA	00	V	500	1	0	0	2.6	-2.5	-2.7
V2XM	00	V	500	2	0	0	4.4	0.8	-0.5
V2XM	12	V	500	4	0	0	4.4	1.6	1.7
ZCBP6	00	V	500	5	0	0	4.4	0.1	1.6
ZCBP6	12	V	500	9	0	0	4.4	-1.3	0.5
ZDLP	00	V	500	26	0	0	4.4	-0.3	0.8
ZDLP	12	V	500	26	0	0	3.5	0.5	0.3
03953	00	V	500	30	0	0	2.1	-1.2	-0.5
03953	12	V	500	31	0	0	3.5	-0.7	-0.3
04018	00	V	500	31	0	0	2.0	0.2	0.1
04018	12	V	500	31	0	0	2.2	0.2	-0.3
04220	00	V	500	23	0	4	2.3	1.5	-0.2
04220	12	V	500	25	0	0	4.3	-0.8	-0.7
04270	00	V	500	27	0	0	3.5	-0.6	0.7
04270	12	V	500	27	0	0	3.5	-0.2	0.5
04339	00	V	500	30	0	0	4.1	1.2	0.4
04339	12	V	500	29	0	0	3.9	1.5	0.9
04360	00	V	500	30	0	0	4.0	0.1	0.8
04360	12	V	500	30	0	0	3.3	-0.1	1.0
08001	00	V	500	25	0	0	3.4	1.2	1.3
08001	12	V	500	25	0	0	3.9	-0.2	0.0
08508	00	V	500	1	0	0	3.8	-0.9	0.8
08508	12	V	500	25	0	0	3.8	0.1	0.7
08594	00	V	500	21	0	0	2.5	1.2	-2.0
08594	12	V	500	27	0	0	3.1	1.4	-2.4
60020	00	V	500	21	0	4	2.7	-1.9	0.3
60020	12	V	500	27	0	0	9.5	-0.7	-0.1
71600	00	V	500	30	0	0	2.9	0.2	-0.2
71600	12	V	500	31	0	0	2.7	0.4	-0.1
72201	00	V	500	30	0	43	2.7	1.0	-1.0
72201	12	V	500	30	0	46	2.2	-0.1	-0.8
72402	00	V	500	28	0	0	2.5	0.9	-0.8
72402	12	V	500	30	0	0	2.7	-0.2	0.0
74494	00	V	500	28	0	0	3.3	-0.4	0.0
74494	12	V	500	31	0	0	2.1	-0.2	1.1
78016	00	V	500	28	0	0	2.5	0.0	-0.2
78016	12	V	500	31	0	0	2.0	0.8	0.4

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45